

THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

DECEMBER 1950

**Clarence Center, N.Y. plant
of National Gypsum Co.**

Stand-Up Stamina



SUSTAINED EARNING POWER—*that's Mack*

• Wherever there's earth or rock to be moved... wherever there's need for *extra* performance, *extra* stamina, *extra* dependability—there you'll find a job that's made to order for a Mack.

Mack's proved superiority in earth moving work rests on *built-in* superiority of design and construction. In addition to their inherent power, strength and durability, Mack trucks bring you outstanding advances in maneuverability, ease of control, positive traction and maintenance accessibility.

Follow the lead of profit-wise operators who have discovered from actual experience that when it comes to working harder, lasting longer and operating at lowest cost—there's nothing to equal a Mack. Your nearest Mack branch or distributor will give you the full story on what Mack's *sustained earning power* can mean to you in greater profits through greater output at lower cost.

Be Profit-Wise

Modernize with



...outlast them all

Mack Motor Truck Corporation, Empire State Building, New York 1, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

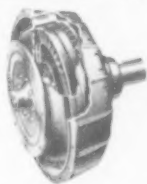


ROCK BUSTING (NOT SHOVEL BUSTING) PERFORMANCE!



LORAIN makes this statement for the "50" in rock! *You will dig more rock with less shock and work more hours per year!* The reason? There's a shock-absorbing hydraulic coupling on the engine drive. Scientific tests prove that the shocks and strains of rock digging are gently cushioned by this "fluid drive". Not only are these digging shocks stopped short of the engine but they "melt" away without ever reaching the turntable mechanism and cables. You can put power at its peak into "rock-busting" performance — with the assurance your Lorain-50 shovel takes no undue punishment that will lead to "shovel-busting" headaches. Your Distributor for Lorains will back up these facts — ask him for the proof about the "50".

THE THEW SHOVEL COMPANY, LORAIN, OHIO



HYDRAULIC COUPLING

Kills Shock in Rock

Only the Lorain-50 "Series" Shovel offers you these important advantages in a 1-yard class machine! They add yards and years to performance in rock.

- The engine can't be stalled under any digging condition.
- Digging impacts and stresses are absorbed by the fluid clutch — can't reach either engine or turntable.
- Power "hangs-on" until the dipper is loaded with the toughest rock.

*You Get Them
Only In The "50"*

*FOR DRAGLINE DUTY
there's an extra long 14-
foot crawler — to improve
flotation, reduce ground
pressures and eliminate
"nosing-in".*



SEE YOUR THEW-LORAIN DISTRIBUTOR FOR PROFIT FACTS ON THE "FIFTY"



Bror Nordberg
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Editorial Consultant

This Month

We Hear	55
Editorial—An Outstanding Example of Free Enterprise in Operation	63
Rocky's Notes—Little Used Tools for Concrete Research	65
Labor Relations Trends	67
The Personal Side of the News	69
Industry News	73
Hints and Helps	76
New Machinery	78
Low Unit Cost Gravel Operation	80
	<i>Walter B. Lenhart</i>
The National Gypsum Company Story	83
	<i>Bror Nordberg</i>
Research—The Key to Diversification	92
	<i>Frank L. Marsh</i>
Plant Operations Geared For Lowered Unit Cost	94
Gypsum Operations	95
Lime Plant Operations	108
Mineral Wool Plants	111
Quarrying and Mining Practices	112
Transportation of Products and Raw Materials	115
A Planned Program to Benefit Labor	118
	<i>Charles H. Dwyer</i>
Training in Human Relations Given to Supervisors	120
	<i>F. A. Manske</i>
Record Proves Soundness of Safety Program	122
	<i>M. C. M. Pollard</i>
Dealer Organization the Foundation for Sales	124
	<i>L. J. Fitzpatrick</i>
Crushing Practice and Theory	128
	<i>Brownell McGraw</i>
Cooling Rate of Cement Clinker	130
	<i>R. G. Uhlig</i>
Cement Plants in India Increase Capacity	131
	<i>Erik B. Mogensen</i>
Industrial Sand Producers Discuss Problems Confronting Industry	132
Cement and Quarry Men Discuss Hazardous Operations and Driver Training	134
Mining Engineers Visit Aggregates Plants	139
	<i>William E. Ham</i>
Color Glamorizes Concrete Units	181
	<i>Walter B. Lenhart</i>
Produces Air-Cooled Slag Block	184
Regional Meeting of American Concrete Institute	186

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EASTON'S NEW TP QUARRY TRAILER

The Greatest Side-Dump ever built!



- ▶ TP-1114 • CAPACITY 14 TONS
- ▶ TP-1317 • CAPACITY 17 TONS
- ▶ TP-1520 • CAPACITY 20 TONS

13% INCREASE IN WATER LEVEL CAPACITY
— with no increase in overall dimensions!

It's the brand new EASTON TP doorless, reversible, two-way side-dump quarry trailer! EASTON Trailers have long been renowned for their rugged, durable quality. Now, all-welded, with several innovations in construction and reinforcement, they're sturdier than ever! Always outstanding as a big payloader, the improved TP body design now adds 13% more capacity with no increase in dimensions. Three years of intensive engineering and experiment have been expended on the TP program to give

quarry men the greatest side-dump we have ever built. Redesigned from the ground up, employing the new EASTON E-Series axles, featuring wide base rims; larger diameter and wider air powered brakes; heavy-duty, slipper-shoe-mounted springs; and improved load distribution, the new EASTON TP's offer faster, more efficient haulage than ever before. Investigate now! EASTON engineers will be pleased to consult with you toward improved quarry transportation.

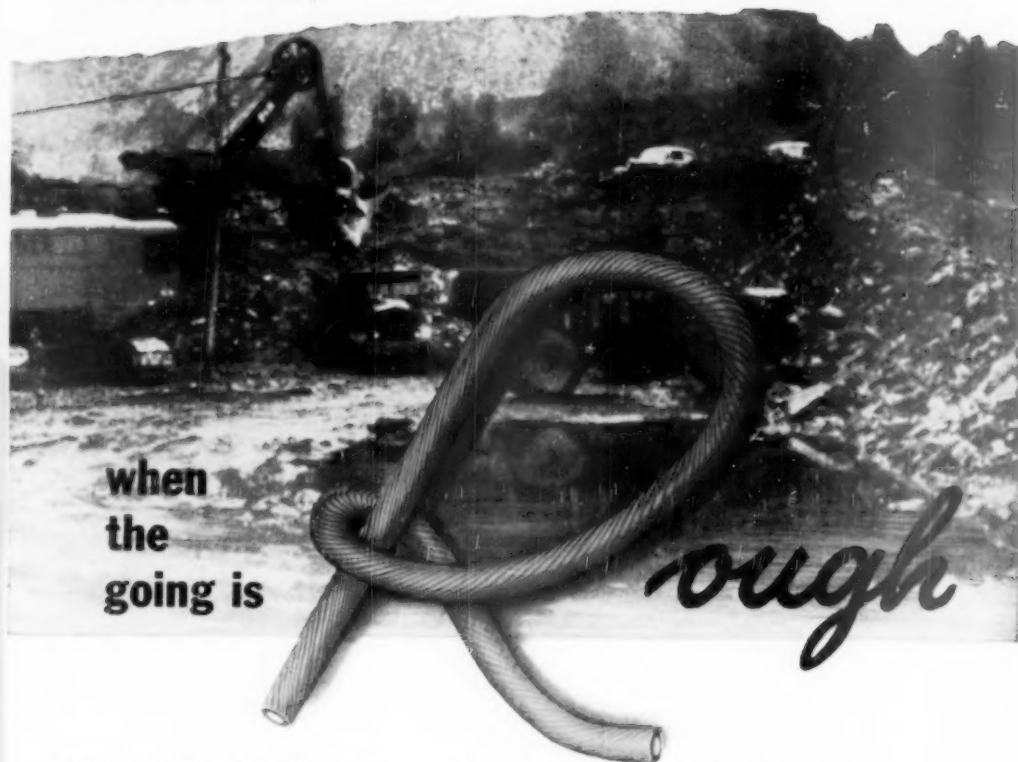
EASTON TP TRAILERS may be used in combination with any well-known make of truck-tractor. Designed for fixed-point dumping either by EASTON automatic electric overhead hoist or hydraulic body hoist. EASTON BP Bodies of the same design, same capacities, are available for chassis mounting.

EASTON CAR & CONSTRUCTION CO. • EASTON, PA.

EASTON
CARS · TRUCK BODIES · TRAILERS

WIRE COUNTERED PRIMACORD

makes it easy . . .



WIRE COUNTERED PRIMACORD is *armed* with closely stranded brass wire. This wire counter has 2 important advantages:

1. The wires increase the *tensile* strength of the Primacord.
2. The wires *resist abrasion*; protect the Primacord during loading operations, or when it is used in ragged holes.

For these reasons, Wire Countered Primacord is favored when the going gets rough. It is recom-

mended for use as down lines in deep or ragged holes. Hook up to the main line with a simple half hitch — it is not necessary to strip the wires to secure positive detonation.

There is a grade of Primacord to meet every blasting condition: Plain, Reinforced, Wire Countered and Plastic Covered. Each is flexible, easily handled from spools containing 500 and 1,000 feet each; waterproof, and insensitive to stray electrical currents.

Ask your explosive supplier, or write to The Ensign-Bickford Company, Simsbury, Conn.

Wire Countered

PRIMACORD-BICKFORD Detonating
Fuse.



This is all there is to the "Feather-Touch" Clutch Control. No valves or tubing. Nothing affected by temperature. Nothing to refill.

Ease of Control means MONEY!

Easy control means faster operation and higher output per unit of time and it means a higher output curve as the day progresses because it reduces cumulative fatigue.

The Northwest brings you the "Feather-Touch" Clutch Control—a simple *mechanical* device that throws heavy drum clutches through the power of the engine. There are no pipes, no pumps, no valves and nothing to refill. It is not subject to influence by weather or temperature. It brings the operator the "feel of the load" at all times. Release is positive and your machine *cannot be shut down by control failure*.

In conjunction with the Northwest Dual Independent Crowd, that utilizes force other independent crowd shovels waste, it makes the rock jobs easier and assures greater output.

It is just another of the many Northwest advantages that make the Northwest a real Rock Shovel. You can't afford anything but the best for the Key Spots at the heart of the job. You should know about Northwest advantages. Ask for details and plan ahead. Why not place your order and be sure of a real Rock Shovel?

NORTHWEST ENGINEERING CO.

1514 Field Building, 135 South LaSalle Street, Chicago 3, Illinois



NORTHWEST



*Big and Strong...
Better than Ever...*

**MARION
111-M**



Machine illustrated has Diesel power with electric swing.
Also available as full Ward Leonard Electric machine.

MARION gave the industry a new conception of excavating equipment in 1946 when the MARION 111-M was introduced. Here was a 3½-4 cu. yd. machine with all of the benefits of Diesel power PLUS all of the advantages of electric swing. Big enough for high daily yardage, yet easily moved from one job to another. Power enough to stand up to big jobs without flinching. Heavy enough to be steady on its long, wide crawlers.

Now—the MARION 111-M is bigger and stronger—better than ever. It is a thoroughly field-proven machine, piling up performance

records that are truly impressive. (Write for copies of letters from 111-M owners.)

Regardless of whether you have seen the MARION 111-M before, you should see it today if a 3½-4 cu. yd. machine has a logical place in your operations. It's a rugged, heavy machine as a shovel or dragline with power and strength to spare.

The 111-M is an important new tool for heavy-duty material handling. Get the full story from your MARION representative or write to the factory for information.

MARION

POWER SHOVEL COMPANY

MARION, OHIO, U.S.A.

Offices and Warehouses in all Principal Cities • Established 1884



CURVED JAWS...

FOR GREATER CRUSHING EFFICIENCY IN THE TRAYLOR TYPE R JAW CRUSHER

This cut-away of a Traylor Type R Crusher shows clearly the advanced design characteristic of all Traylor-built equipment. Each feature contributes to larger profits through higher production with lower power and maintenance costs. The Type R Crusher, built in five sizes up to 56" x 72", is completely described in illustrated Bulletin 123 shown below.

1—The Meehanite® metal frame is of box section design which provides maximum strength per pound. Uniform metal thickness and annealing in sand insure castings free from flaws, shrinkage cracks and checks.

2—Heavy steel reinforcing rods are shrunk in place on each side at the top of the crushing chamber and through the strengthening band at the bottom of the frame.

3—Forged steel rods of extra large diameter make up a very strong pitman which is relatively light in weight.

4—The exclusive Traylor swing jaw suspension holds the swing jaw shaft in a fixed position. This materially reinforces the top of the frame.

5—The non-chokable, smooth-face curved jaw plates, of patented Traylor design, keep horsepower per ton requirements low. Made of manganese steel, they outwear conventional plates, often by as much as 3 to 1.

(* Reg. U. S. Pat. Off.)



Write today for your copy of Bulletin 123.
See how curved jaw plates can increase
your profits by reducing your crushing costs.

Traylor

Rotary Kilns, Coolers and Dryers
Grinding Mills • Crushing Rolls
Jaw, Reduction and Gyratory Crushers

TRAYLOR ENGINEERING & MANUFACTURING CO.
216 Mill St., Allentown, Pa.

Sales Offices: New York, N. Y., Chicago, Ill., Los Angeles, Calif.
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P. Q.

A "TRAYLOR" LEADS TO GREATER PROFITS

Serving the Non-Metallics

... the Raymond
ROLLER MILL

Built in

Two Types...

**HIGH SIDE
ROLLER MILL**

with Whizzer Separator for High
fineness grinding to 99.9% or
better passing 325 mesh.

**LOW SIDE
ROLLER MILL**

for medium fine grinding to about
95% passing 100 mesh.

*For complete
Roller Mill in-
formation write
for Catalog No.
61.*

Partial list of
non-metallics
ground with
Raymond
Roller Mills

Gypsum
Limestone
Bentonite
Barytes
Fuller's Earth
Dolomite
Magnesite
Bauxite
Ceramic Clays
Kaolin
Marble
Phosphate Rock
Sulphur
Talc
Coal



COMBUSTION

Sales Offices
in Principal Cities

Industry for more than 60 years

FINENESS RANGE

About all passing 20
mesh to 98.5% or better
fineness 325-mesh

CAPACITY RANGE

From a few tons to 30
or more tons per hour.

MOISTURE RANGE

Initial surface moisture
as high as 10% or 12%
in many cases may be
handled by Flash Drying.

The Raymond Roller Mill with its long record of dependable performance and constant improvement over the years, offers many advantages for pulverizing non-metallic minerals.

These units are noted for their ease of fineness adjustment and consistent finished products at any fineness specification. Other advantages of Raymond Roller Mills include:

New type feed control, maintains peak operating capacity, and assures highest tonnage per horsepower.

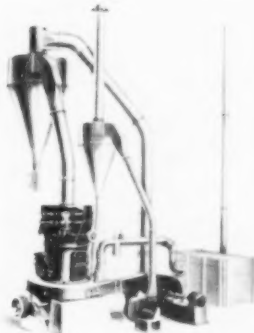
High efficiency air separation.

Dustless operation.

Heavy rugged construction for long service life.

Ability to simultaneously grind and dry materials with Flash Drying accessories in a single continuous process without use of separate dryers or conveyors.

Raymond Roller Mills are adaptable to practically any floor plan or building layout with assurance of record-low production costs. Let Raymond experience help you solve your grinding problems without obligation.



MOISTURE REMOVAL

Typical arrangement
of Roller Mill with
Flash Drying accessories.

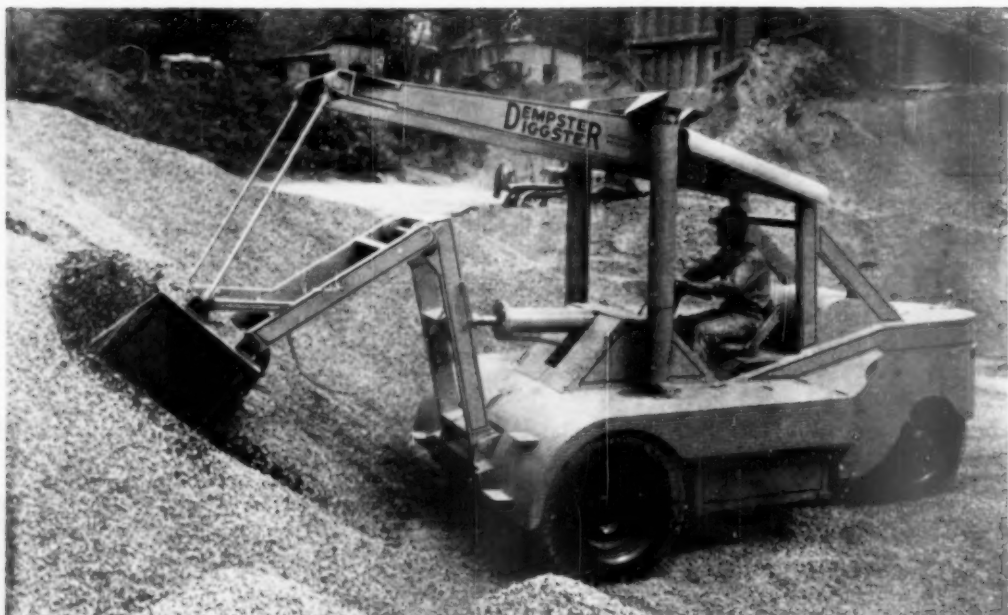
ENGINEERING — SUPERHEATER, INC.

RAYMOND PULVERIZER DIVISION

1307 NORTH BRANCH STREET

CHICAGO 22, ILLINOIS





THE Dempster Diggster, Type GRD, same as the one that loaded 600 tons of stone recently, has a 15 foot six inch turning radius, is 20 feet long when bucket is in traveling position, and bottom of bucket

is nine feet three inches above ground when in extreme dumping position. It will dig 15 inches below grade and through a 15 foot bank. Note how bucket follows the slope of the material.



THIS Dempster Diggster, Type HL, is specially equipped for high dumping. The bottom of the bucket is 13 feet six inches above ground. It will dig through an 18 foot bank.



FOR FAST, EFFICIENT operation in difficult terrain, the Dempster Diggster is available with crawler-type traction.

Fast Automotive Shovel Loads 600 Tons of Stone in Half a Day

CONTRACTOR REPORTS: HYDRAULIC CROWD, HOIST UNIT "FILLS LONG NEEDED PLACE IN OUR INDUSTRY"

THE Dempster-Diggster, a revolutionary shovel loader, recently loaded 600 tons of broken stone in the first half day of operation. This outstanding performance was reported to Dempster Brothers, Inc. by W. E. Lambert, president of Lambert Brothers, Inc., one of the nation's largest crushed stone contracting firms.

"In connection with our extensive activities in several southern states," the contractor said, "we have used various types of power shovels and front end loaders. After seeing the easy operation of the hydraulically operated Diggster in a demonstration we had made alongside of a competing loader, we placed an order with you. We installed the Diggster equipped with a yard and half stockpile bucket on one of our operations in western North Carolina.

"Our records show," he continued, "that the unit loaded approximately 600 tons of broken stone in the first half day of operation. The Diggster has been working continuously and is giving perfect satisfaction. It is a pleasure for us to so advise you because in our opinion the Diggster fills a long needed place in our industry. We welcome you to bring

any interested parties to our operation to see the Diggster in action."

The tremendous speed of the Dempster-Diggster in excavation and stockpile work is accounted for, mainly, by its exclusive independent hydraulic crowd and hoist action, the hydraulic steering, and wheel-type traction, which permits truck speeds to and from jobs. The power crowd permits bucket to keep digging until loaded . . . no digging with wheels. The hydraulic steering gives the driver easy, fast, finger-tip control.

Four standard interchangeable buckets of two types are available. Digging buckets with four bottom teeth in 1 and 1 1/4 cubic yard (heaped) capacities; materials handling buckets in 1 1/2 and 2 cubic yard (struck) capacities.

Complete information and prices may be obtained by writing the manufacturer, Dempster Brothers, Inc.

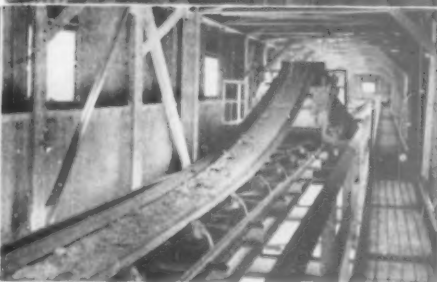
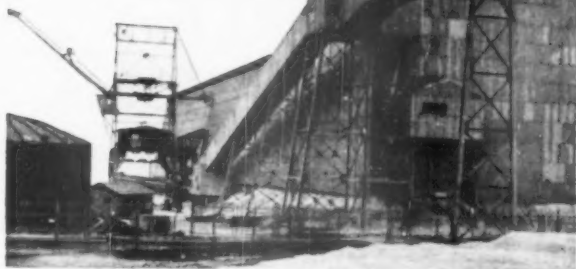
DEMPSTER DIGGSTER

DEMPSTER BROTHERS

3120 N. Knox
Knoxville 17, Tennessee

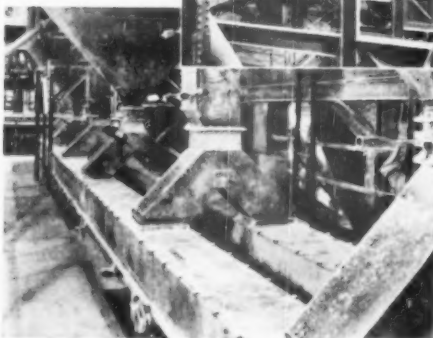
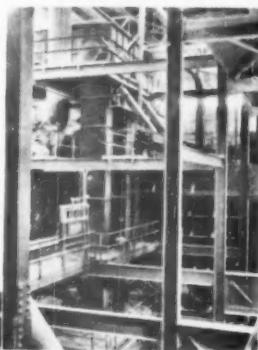
It's **LINK-BELT** BELT CONVEYORS BUCKET ELEVATORS SCREW CONVEYORS

At National Gypsum Company
Gypsum Board Plant
Baltimore, Maryland



The storage shed and the open-yard storage served by 30" wide Link-Belt Roller Bearing Belt Conveyors equipped with traveling trippers (insert) for distributing the gypsum rock from the ship-unloading tower at 500 tons an hour.

Two Link-Belt steel-encased Continuous Bucket Elevators deliver gypsum to the screw conveyors that feed the various surge bins.



Two Link-Belt 12" diameter Helicoid (screw) Conveyors handle the gypsum from cyclone collectors to kettle feed bins.

LINK-BELT COMPANY

Chicago 8, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices in Principal Cities.

A Complete Job

This is another example of Link-Belt engineering and Link-Belt products integrated into a flexible handling system that provides efficient transportation of materials in the quantities required.

Up to 500 tons of gypsum rock an hour travel over fast-moving Link-Belt Conveyors from the ship-unloading tower to either the open-yard storage or to the storage shed. Other belt conveyors handle 90 tons an hour to the dryer from either reclaiming hopper. Link-Belt Bucket Elevators and Screw Conveyors handle the crushed gypsum rock to the silos and bins.

This integrated system also contains such standard Link-Belt products as: roller bearing idler rolls, rubber-tread impact idlers at the loading points of the belt conveyors, belt-training idlers to assure proper positioning of the belt; ball and roller bearing pillow blocks; welded steel pulleys; herringbone gear, worm gear, silent chain and roller chain drives and P.I.V. variable speed drives.

Whatever your need in materials handling and power transmission, it's a job for Link-Belt equipment and engineering.

10-112

LINK-BELT

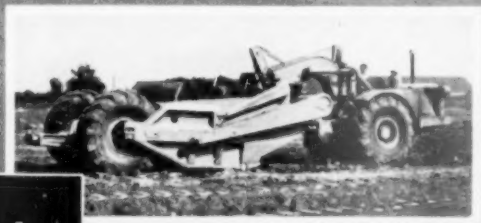
CONVEYING MACHINERY

"The Complete Line"





2 giant new "Caterpillar" Earthmovers



**...built to outspeed,
outwork and outlast
all comers!**

With their high speeds and huge capacities, these two new "Caterpillar" Earthmovers have what it takes to step up your pace of stripping and hauling overburden. And you know how important pushing work through ahead of schedule is these days, with peak production vital to national defense.

Both these giants are powered by the new 225-HP., 6-cylinder "Cat" Diesel Engine. The 4-wheel DW20, with top speed of 26.6 m.p.h., is available with three matched units: the W20 Wagon, the No. 20 Scraper and the No. 20S 'Dozer. The 2-wheel DW21 has a top speed of

20 m.p.h. and trails the No. 21 Scraper. Features are described on the opposite page.

Here are typical reports on the DW20-W20 unit (25 cu. yds. heaped capacity): "You can run away from other rigs with it," says Operator Robert England. "The dump control is handy and easy to operate. It's got good brakes—you can stop it still, loaded. It's safe on turns and grades. It shifts easy and fast. The engine's got guts." Drag-line Operator R. D. Johnson adds: "It's good and wide—you don't waste a bucket. It gets in and out faster than any I ever loaded."



THE DW20 TRACTOR AND W20 WAGON UNIT

This big-capacity unit offers:

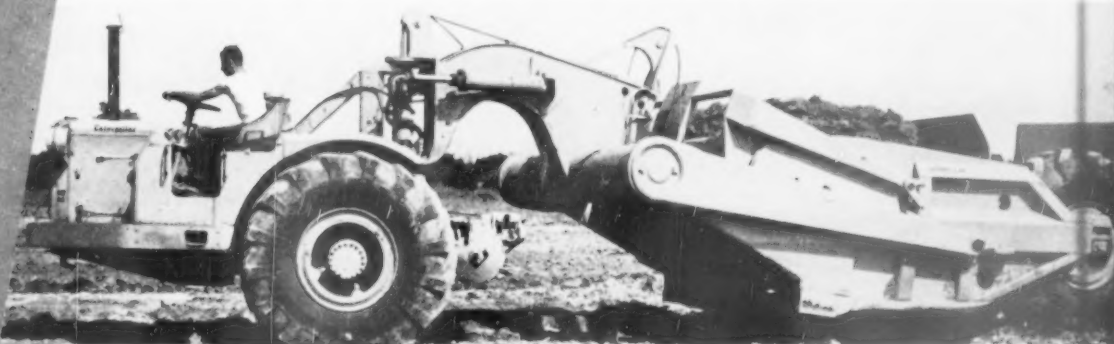
17 cu. yds. capacity, truck, 25 cu. yds., heaped
Travel speeds, through five gear ratios, from 2.88 to 26.6 m.p.h.
Wide-mouthed hopper to provide easy-to-hit target for shovel or dragline loading.
Controlled dumping — openings can be varied without mechanical

adjustment — permitting either dumping or windrowing.
Accurate hydraulically controlled dumping with positive mechanical lock on dump doors.

The DW20 Tractor with No. 20 Scraper offers:

The same capacities, speeds and general specifications (except in type of gooseneck) as the No. 21 Scraper.

The DW20 Tractor is also available with the No. 20S Bulldozer.



THE DW21 TRACTOR AND NO. 21 SCRAPER UNIT

This big-capacity unit offers:

Full 90° turn each way — non stop turn in 35 ft.
15 cu. yds. capacity, truck, 19½ cu. yds., heaped. With available 12" extensions: 18 cu. yds., truck, 22½ cu. yds., heaped.
Travel speeds, through five gear ratios, from 2.16 to 20 m.p.h.
Bowl and apron designed to promote "boiling" action of earth through center of load — for full-measure yardage, minimum loading time.

Large low-pressure tires for easy load flotation.
Dozer-type ejection for positive "kicking out" of sticky material, dependable spring-action ejector return.
Open bowl design for visible loading under shovel or dragline.
Adjustable rear axle to permit level cuts and desired settings.
Double bottom of special alloy steel. Self-sharpening, reversible cutting edge.
High apron lift, low center of gravity.

DW20 AND DW21 TRACTOR FEATURES

NEW ENGINE: The completely new 6-cylinder "Cat" Diesel Engine . . . 225 HP. at 1900 r.p.m. available at the flywheel . . . 275 HP. peak capacity at 2000 r.p.m. tested in accordance with A.S.M.E. Power Test Codes.

TRANSMISSION: Constant-mesh transmission and heavy-duty clutch. Special locking device prevents gears from becoming disengaged.

STEERING: Hydraulic booster steering follows the natural "feel-of-the-road" hand guidance. Heavy steel stops keep gooseneck of drawn equipment from jack-knifing.

BRAKES: Each large, heavy-duty brake is 22" in diameter, 7" wide. Compressed air energized brakes on both tractor and drawn member of unit. Handy control valves for applying both sets of brakes, and to either right or left driving wheel.

OPERATOR COMFORT: Airfoam rubber cushion on bucket-type seat mounted on coil spring with hydraulic snubber. All controls within easy reach. Excellent visibility.

Built to the exacting standards that characterize all "Caterpillar" equipment, these big yellow earthmovers are production boosters from the word "go!" What's more, your nearby "Caterpillar" dealer is on call for immediate service. For full information about these rigs, see him or write the factory.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES • TRACTORS

MOTOR GRADERS • EARTHMOVING EQUIPMENT



Face showing loading operation. Drill holes approximate 85 feet, 9 1/4 inches in diameter. Burden averages 21.5 feet, spacing 26 feet.



Close-up of typical loading operation. "Nitramex" No. 2, especially developed for bottom loading, gives additional strength needed to break hard-rock toe.



Wires are attached to Du Pont Blasting Timer set at .020 interval. Rotational firing creates a peeling action that reduces vibration and improves fragmentation. Secondary blasting is held to a minimum.

DAY-TO-DAY BLASTING PROVES ECONOMY OF DU PONT "Nitramex" No. 2

**Helps improve fragmentation . . .
reduce secondary blasting**

Operators of the Benson open pit Magnetite iron ore mine of the Jones and Laughlin Ore Co., Star Lake, N. Y., are using Du Pont "Nitramex" No. 2 in routine blasting operations. Their experience has proved the economy and efficiency of this blasting agent for better fragmentation and reduced secondary shooting.

The effective blasting plan adopted for a typical and difficult toe condition calls for bottom loading of "Nitramex" No. 2. This new-type blasting agent readily breaks up tough bottom rock. Its high density and slow pressure development result in a powerful spreading action . . . permit increased spacing, reduce drilling and blasting costs.

"Nitramex" No. 2 retains all the safety characteristics of Du Pont "Nitramon." It cannot be deto-

nated by friction, falling objects, or even the impact of ball ammunition. But like "Nitramon," it is dependably detonated with a "Nitramon" Primer, itself relatively insensitive.

The remainder of an average load consists of Du Pont "Nitramon" and "Nitramon" Primers connected by Primacord and detonated with Du Pont Electric Blasting Caps. Split-second blasts, with the Du Pont Blasting Timer set at intervals of .020 second, peel the rock from the face, giving excellent fragmentation.

Ask your Du Pont Explosives representative to explain how "Nitramex" No. 2 may help you to do a more efficient, more economical job of blasting. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

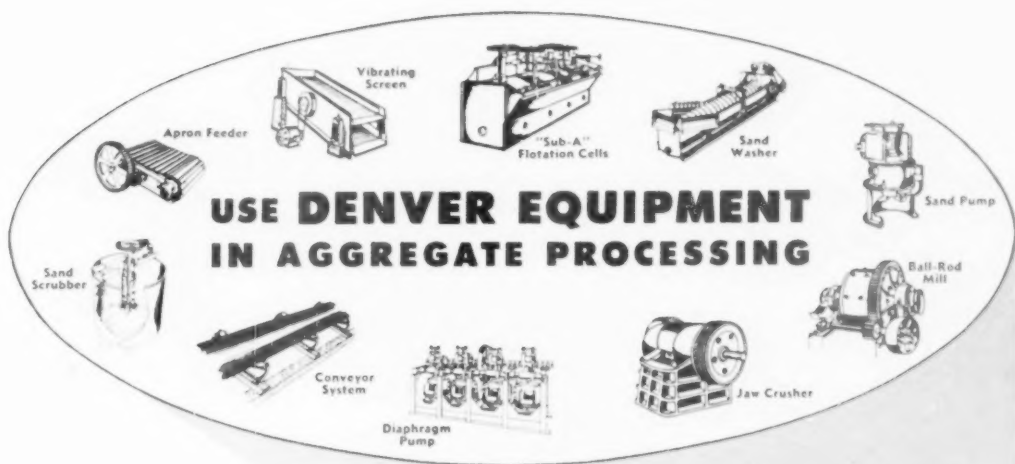
*Reg. Trade mark for ammonium nitrate blasting agent.
**Reg. Trade mark for nitrocellulose blasting agent.



**DU PONT
"NITRAMEX" No. 2**

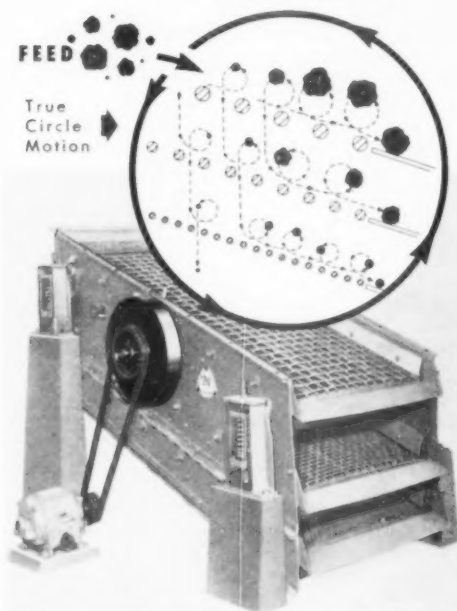
Not currently for sale in western states

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY



USE DENVER EQUIPMENT IN AGGREGATE PROCESSING

**less fines in
classified aggregate
by using the**



DENVER-DILLON Vibrating Screens

Better Cleaning . . . Less Penalty . . . More Profit.
Material literally comes straight down hundreds of times over the complete area of the fully activated screen so that every particle of undersize passes through the screen. Result is a minimum of undersize in every sized product.

Circle Throw Eccentric More than Vibrates the Screen.
The true circle motion lifts each particle up, back and directly down onto the screen cloth. Material more than flows across the screen . . . hundreds of times it moves up, back and down so that every particle of undersize passes through.

Result . . . a cleaner product . . . less penalty . . . more profit.

With the Denver Dillon Screen you also get . . .
Two Bearing Suspension . . . Fifty Percent Less Horsepower Consumption . . . Minimum Maintenance . . . No Blinding of Screen Cloth . . . and many other features.

Want more information on this super screen?

Write today for Bulletin S3-B5, giving us some idea of your screening problem. You will receive a prompt reply and a solution.



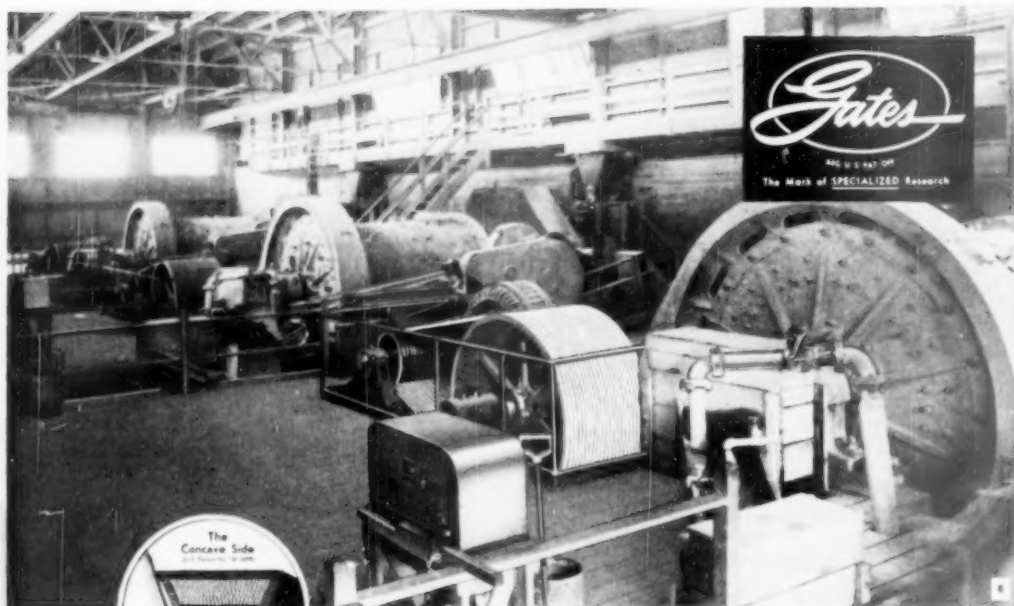
FLOTATION ENGINEERS



"The firm that makes its friends happier, healthier and wealthier"

DENVER • NEW YORK • CHICAGO • EL PASO • VANCOUVER • TORONTO • MEXICO, D.F. • LONDON • JOHANNESBURG

DENVER EQUIPMENT COMPANY, 1410 17th St., Denver 17, Colorado



Profits of Bagdad Copper Corporation's isolated Arizona plant depended on maintaining economical and trouble-free operation. They chose the Gates Vulco Rope Drives (shown) for these big ball mills because of their proven ability to handle this rugged service. Also, because the failure of one belt would not necessitate a shutdown, but would give ample notice when a replacement set of belts was needed.

Let this simple test tell you exactly WHY the Concave Side cuts your V-Belt costs

To see for yourself the belt-saving importance of the Concave Side, just pick up *any* V-belt and bend it as it bends when it goes around a pulley.

As the belt bends, grip its *sides* firmly with your fingers. You will feel the sides of the belt *change shape*. This is because the top of the belt is under tension and, hence, grows *narrower* while the body, under compression, *bulges out*. (See figure 1 and 1-A)

Now look at figures 2 and 2-A. There you see how the bending changes the shape of the belt that is built with the Concave Side—The Gates Vulco Rope. The concave sides of this belt merely *fill out* and become perfectly *straight*. There is no side-bulge. This belt, when bent, *precisely fits its sheave groove*.

A very distinct saving in belt wear results. No side-bulge means that the sides press *evenly* against the V pulley and therefore wear *uniformly*—resulting in longer life for the sidewall and, naturally, longer life for the belt!

If you care about cutting your belt costs, it will pay you to make sure, whenever you buy V-Belts, that you get the V-Belt with the Concave Sides...the Gates Vulco Rope!

What Happens When a V-Belt Bends

Straight-Sided V-Belt



Fig 1



Fig 1-A

How: Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear at Point Shown by Arrows.

Gates Vulco Rope with Concave Side



Fig 2



Fig 2-A

The Concave Side Fills Out to a Precise Fit in the Sheave-Groove. No Side-Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

CS-508

THE GATES RUBBER COMPANY
DENVER, U.S.A.
World's Largest Makers of V-Belts

GATES VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks
IN ALL INDUSTRIAL CENTERS
of the U.S. and 71 Foreign Countries

Barber-Greene *Photo-News*

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ECONOMY

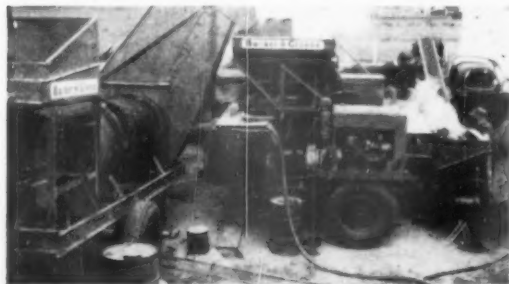
ON-THE-JOB VIEWS AND COST-SAVING IDEAS VOLUME 1—NUMBER 2

OPERATION ASPHALT SETS PAVING RECORD

Baltimore broke all existing street paving records when 14 blocks of arterial streets were paved in one day. Such speed was necessary if costly interruptions and tie-up time were to be held to a minimum. Ten Barber-Greene Finishers placed the required 23,500 sq. yds. of 2 and 3 course hot-mix in 13½ hours . . . to everyone's complete satisfaction. Contractors (7 cooperated), city officials and engineers . . . even the "sidewalk superintendents" . . . agreed that "Operation Asphalt" was a huge success.



Complete Maintenance Plant in Portable Package



PAVING PACE FAST IN VERMONT, TOO

Up here in the northern reaches of the U. S., the Highway Department of Vermont sees to it that this B-G Portable Maintenance Plant really gets around. Ten moves were made in each of the last two seasons. The plant processed as much as 35,000 tons of cold-mix before January snow forced a shutdown. Each of these moves was completed in less than three days, including an average of 75 miles of road travel between set-ups. This quick, economical portability is a big cost-cutting advantage. It enables the state of Vermont to profitably handle a large amount of its own maintenance work on a year-round basis.

Close-up from Dryer end. Note set-up in yard.

Barber-Greene *Photo-News*

CONVEYOR SYSTEM DOUBLES in DOLOMITE

A unique system for handling two different types of products has been built around this B-G Permanent Conveyor by Consumers Co. of McCook, Illinois. Here you see it carrying limestone from the crusher to discharge from a height of 56' onto a surge pile. Capacity is 600 tons per hour. Tunnel conveyor beneath surge pile carries stone under tracks to dolomite plant. When the second product—limestone for railroad ballast, road and construction work—is being processed, a B-G Tripper spills material from the conveyor into a bucket elevator. The limestone is then carried into the main processing plant. Here is another example of how the effective use of simple, standardized B-G Conveyors minimizes the expense and manpower of high capacity moving of bulk materials. Note how small, under-hung conveyor discharges to clear the supports.



SAVINGS MARKED OFF BY THE ACRE The Hanna Coal Company is now saving an estimated 200 to 400 tons of coal per acre at their Number 12 Mine in Georgetown, Ohio. This is coal that was previously left in the mine, buried under the spoil from previous cuts. But now with the help of this B-G machine, the shovel operator is loading out nearly 100%. The B-G Ditcher, in this operation called a "marking machine," cuts a 5" wide trench to the full depth of the seam, marking a "go-no-farther" line for the shovel, and leaving a vertical wall in place of a saw-tooth edge which formerly trapped coal under spoil. This is another example of sound B-G engineering solving unusual problems economically, simply, with minimum manpower.

BAY CITY BEAUTIFIER

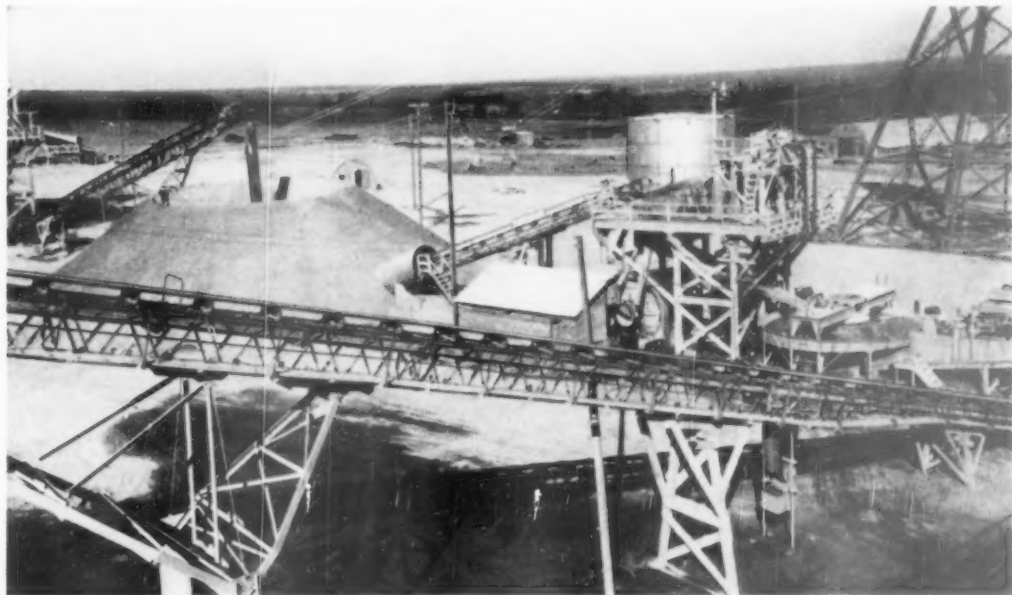
San Francisco has long been noted for its beautiful parks and beaches. Now, to insure that those parks and long stretches of white sand remain the envy of the world, a B-G Crawler-Mounted Bucket Loader performs a multitude of services for the Park Commission. They use it to clear away drifted sand in the dividing strip of seaside, multi-laned highways; stripping loam for use in maintaining or establishing new grass areas; as a loader of debris, sand, etc., as an excavator for cutting new park paths. The beaches get their beauty treatment at frequent intervals when the B-G Loader patrols the bathing strip, removing glass, stones, paper... even an occasional watch or ring.



for full, fast information on any equipment

BELT CONVEYORS AND "COMPATIBILITY"

Skilful use of belt conveyors is simplifying the job of handling aggregate for the \$20,000,000 flood control project now being constructed by the Mount Morris Dam builders. Featuring the latest in push-button control, the aggregate plant is geared to produce 5 grades of aggregate from the same stone (for aggregate compatibility) at the rate of 4500 tons per day. This impressive production achievement is made possible largely through the use of 17 belt conveyors that handle all stone and aggregate from raw storage to concrete plant. Typical of the jobs B-G standardized, easy-to-install, conveyors are doing, is the first stock pile belt, a 36" x 198' unit with a capacity of 500 tons per hour. The many B-G pre-engineered conveyors in this system are contributing greatly to the efficient, economical handling of aggregate for the 900,000 cu. yds. of concrete required.



BIG, RUGGED — AND PORTABLE

In quarries or gravel pits, in the yards of State, County, and Municipal Highway Departments, railroads, mines, mills, in any industry—any place where heavy-duty portable conveying service is a "must"—this new B-G Portable Conveyor is right at home. In spite of rugged construction for toughest operation, this conveyor is highly portable. It is equipped with a low-mast truck which speeds movement in and around buildings, guards against damage from underpasses while towing. It is THE heavy-duty portable. Send for your copy of new literature.



FOR A TRIM LOAD EVERY TIME

Hydraulically controlled conveyor on this new B-G Loader swivels to trim every load... eliminates spillage or partly filled trucks. This flexibility, plus long reach, allows filling longest, highest trucks, trailers—even railroad cars—to full capacity at a 3 yd. per minute clip. Newest in the B-G line, this Loader travels at 15 M.P.H. on its pneumatic-tired chassis. Easily converted to a 7-11 yd. per minute snow loader to give year-round service. New literature—now on the press—illustrates the many features of this newest B-G Heavy-duty Loader.



on these pages--see your B-G Distributor



CRUSHED STONE MANTEL FOR THE QUEEN'S WAY



MAKING WAY WHILE THE SUN SHINES

In spite of freakish storms and weather extremes, the C. H. Atkinson Co. was able to make way while weather permitted and pave 7.8 miles of U. S. 36 out of Chillicothe, Mo., last season in near-normal time. Chief contributor to this performance was a B-G Utility Mixing Plant and Dryer that turned out top quality mix at a 60 ton per hour rate. Of particular advantage was the Utility Dryer which solved the moisture control problem and assured mixes of a quality that would have been otherwise unobtainable due to the heavy rainfall. A B-G Finisher placed two 3" courses of type B hot-mixed asphaltic concrete over the 20-year-old concrete slab. This was a quick transformation of a rutted, broken roadway with a minimum of interference to normal traffic.

Two B-G Finishers recently completed laying 110,000 tons of stone along the Queen Elizabeth Way between Fort Erie and Niagara Falls, a distance of 18 miles. Often working in tandem, these two green machines spread two courses of raw stone for this penetration macadam in sizes up to $3\frac{1}{2}$ ". In spite of this tough abrasive material, both Finishers went through the entire job without an hour's delay ... completing it in only 1,000 working hours. The final surface is a smooth, durable highway ... the pride of the province. In the words of the engineers "... it cannot be beat."

A 34-YEAR INVESTMENT IN YOUR BUSINESS

Behind every machine in the broad Barber-Greene line stands a 34-year investment in experience, engineering and material handling techniques. This investment can save you money whenever and wherever your problems involve the handling of bulk materials ... mixing and placing bituminous surfacing materials ... as well as ditching and snow removal. Use this investment. Call on your factory-trained, job-experienced Barber-Greene Distributor. Ask him to help you get the most in cost-cutting operation by eliminating the use of expensive equipment and manpower. Further, your Barber-Greene Distributor has service and repair part facilities you can depend upon through the years. For complete information — bulletins, specifications and prices on any or all Barber-Greene equipment — get in touch with your B-G Distributor or call, write or wire directly to the address below.



Barber-Greene Company

AURORA, ILLINOIS, U. S. A.

3 OF MANY REASONS Why Leading Contractors Prefer Lippmann Equipment

"LIPPMANN PULVERIZER IN OUR QUARRY DOES A 2-PULVERIZER JOB!"

says DeHart Brothers,
Kearney, Mo.

Look at the record of this 32 x 36 Lippmann Pulverizer at DeHart's Excelsior Springs quarry. Fed pit-run rock from dust to 32 in., it produces 120 tons per hour "every hour of the day" of ag-lime "100% passing 8-mesh" without using all the horsepower the engine is rated to develop. After producing over 10,000 tons, DeHart has

DeHart Pulverizer handles both
quarry-run and over-size returns.

not even changed the hammer wearing surfaces. Not only for ag-lime, but for road material, manufactured sand, coal or any friable material, there's not a machine made that can touch the Lippmann Pulverizer for high capacity, uniform cubical product, low maintenance and low first cost. Write for Bulletin 1160.



"LIPPMANN ROLL CRUSHER IS 100% BETTER THAN ANY OF THE SEVERAL OTHER MAKES WE'VE USED!"

says P. A. Bradbury, Aberdeen, S. D.

And their letter continues, "Send us another 24 x 16 Roll Crusher exactly like the one we purchased Nov. 20, 1946." No wonder Bradbury Construction Co. wanted an exact duplicate of their Lippmann Roll Crusher — "In less than three years' operation, we produced 548,783 cu. yds. of gravel from hard rock... without any mechanical repairs. In fact, the rolls have never been taken apart, and only required building up the faces 6 times."



In Indiana, Lippmann 42 x 24 Roll Crusher produces 100% ag-lime.

You, too, will find that Lippmann Roll Crushers save you money on repairs, minimize costly production shutdowns. Rugged construction, efficient operation, roll settings within 1/64 in. are reasons why you'll want to find out more about these profit-making machines.

"LIPPMANN SCREEN-ALL IS EVERYTHING WE WANT IN A VIBRATING SCREEN!"

consensus of Hundreds
of Operators

Yes, the Lippmann Screen-All, with its positive eccentric action and perfect circle throw, gives sharper sizing, greater capacities. Patented eccentric hubs and straight shaft design permits perfect counterweighting — no unbalanced forces give longer life, allow lighter substructures. New 3-point support simplifies

Screen-Alls in tandem give mid-
west quarry capacity, sharp sizing.



leveling in the field. Placing bearings outside the screen body reduces headroom required. Quick-change Decks add flexibility for rapid changeover in case production must be shifted to ag-lime, stone, sand, etc. Get the full story. Write for your copy of Bulletin 1200 today.

2002
PRINTED IN U. S. A.



FOR ALL THE FACTS on the complete Lippmann line for pits, mines and quarries write for: Grizzly King Jaw Crushers (Bulletin 1100), Screen-All Vibrating Screens (1200), Pulverizers (1160), Belt Conveyors (1400), Gyro-Gnome Secondary Crushers, Circuit Rider Self-Propelled Crushing Plants, Portable Washing Plants, Apron Feeders (1450).

LIPPMANN ENGINEERING WORKS

4603 West Mitchell St., Milwaukee 14, Wisconsin

Which One is You ?

type one



Do you drill holes all over the lot? A few in this cut—a few for that footing? Then you'll choose the lightweight LCM—the ideal wagon drill for use where moves are frequent.

type two



Do your jobs call for fast drilling? Big footage on every shift? Then you'll want the universal URM—for the last word in wagon drill efficiency and performance.

type three



Do you run into a lot of heavy rock excavation—with cuts up to 40 feet deep? Then the Gardner-Denver WD is the wagon drill for you. It's specially designed for deeper holes.



LCM FEATURES:

- Lightweight—easy to move
- Positive feeding pressure
- Convenient feed and drill controls
- Highly maneuverable
- Equipped for 6-foot steel changes



URM FEATURES:

- Simple, responsive controls
- Maintains correct bit pressure
- Positive, effortless blowing
- Adjustable wheels and mast
- Handles 6-foot steel changes



WD FEATURES:

- Extra powerful blowing
- Air motor feed
- Power operated mast
- Speeds line drilling and broaching
- For 10 or 15-foot steel changes

Whether your drilling pattern fits Type 1, 2 or 3—choose a Gardner-Denver Wagon Drill for faster, easier drilling. Write for Bulletin WD-1.

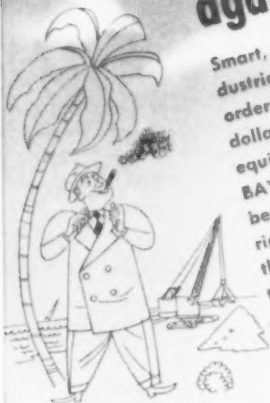


GARDNER-DENVER *Since 1859*

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada) Ltd., Toronto, Ontario

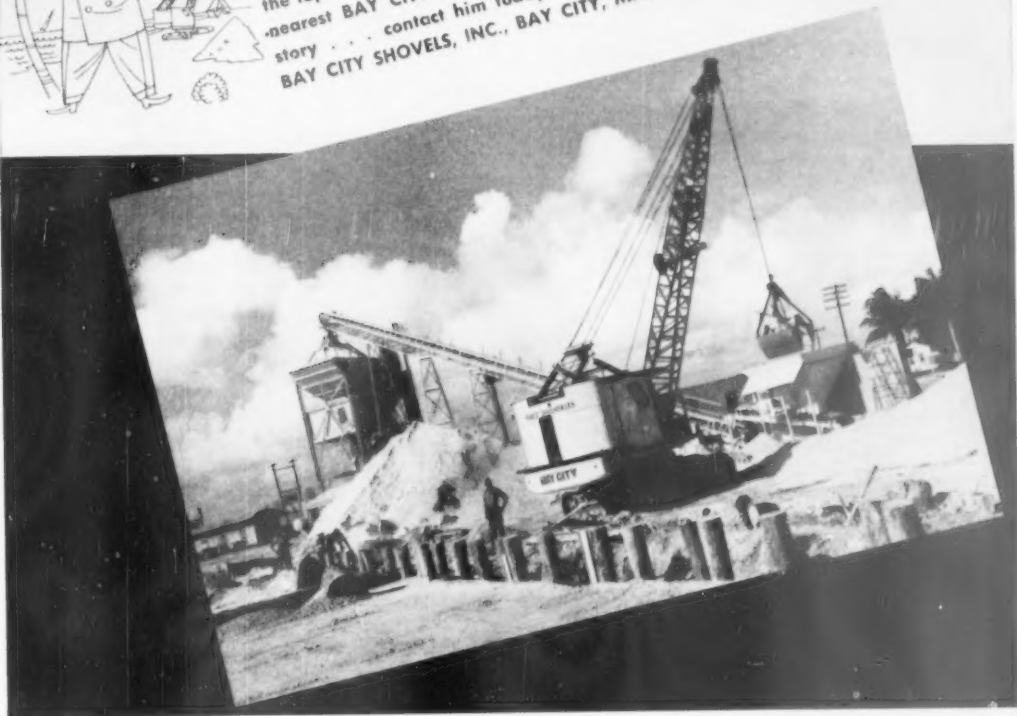
Smart operators buy **BAY CITY...** again and again



Smart, performance-wise concerns like Maule Industries of Miami, Fla. have shown by repeat orders that they are getting more for their crane dollars in BAY CITY. The Model 65 shown here, equipped with oversize bucket, is only one of five BAY CITY machines operated by Maule. That's because there's real crane value in a BAY CITY right from the wide, powerful crawlers, through the compactly constructed, full-vision cab, clear to the top of the rugged, pin-connected boom. Your nearest BAY CITY dealer can give you the full story . . . contact him today or write direct to BAY CITY SHOVELS, INC., BAY CITY, MICHIGAN.

CHECK LIST

- 25 Ton Capacity
- Long, Wide Crawlers
- Alloy Cast Bores
- Tandem Drums
- Power Booster Clutches
- High Line Speeds
- Wide Vision Cab
- Pin-Connected Boom



BAY CITY



SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

ROCK PRODUCTS, December, 1950

6500 pay yds. per day for

On the Columbia River near Bridgeport, Washington, General Construction Company of Seattle is excavating a 4,000,000-yd. intake channel for the powerhouse at Chief Joseph Dam. Project calls for digging approximately 2,500,000 cubic yds. of granite and rock and 1,500,000 yds. of silt-sand from a bend in the river . . . then using the material to relocate a river-side highway. Most of the heavy hauling is being handled by a Le Tourneau fleet of 9 electric-control dirt-movers . . . including 5 rear-dump C Tournarockers and 4 C Tournapulls. Contractor's records show that on hauls ranging from 200 to 4000' one-way, the 5 Tournarockers alone are averaging 812.5 yds. an hour . . . 6500 pay yds. of rock and sand per day.

2200' cycle every 6 minutes

On a typical 2200' cycle, for example, the 5 Tournarockers moved 640 pay yds. an hour. Two 2½-yd. shovels loaded the LeTourneau rock wagons with mixed granite and pocketed sand in 2¼ to 2½ minutes. Loads averaged 16 bank yards. Much of the haul was over narrow roads and up adverse grades . . . yet each Tournarocker completed a round trip every 6 minutes . . . delivered 8 loads an hour.

Fast cycles like these are possible because Tournarocker's short 90° turns and positive fingertip electric steer permit quick spotting both at shovel and at dump. Heavy-duty, multi-disc air brakes on all 4 wheels (4176 sq. in. total braking surface) give operators complete driving safety throughout the haul cycle. Holding action of powerful brakes . . . plus front-wheel drive on big tires of prime mover . . . let Tournarockers dump safely over steep banks. Simple electric hoist tilt body to vertical position . . . streamlined bowl clears loads instantly.

Offer important savings for you

These same Tournarocker advantages which are helping General Construction Company speed Chief Joseph Dam construction offer new low-hauling costs on your jobs, too. Ask your LeTourneau Distributor about this 16-ton, rear-dump Tournarocker. He can also give you complete information on 35-ton as well as 9-ton Tournarockers . . . and, if you wish, will show you how you can get money-saving interchangeability by using the Tournarocker prime mover to power Carryall Scrapers, bottom-dump hoppers, cranes, flatbeds, or other hauled units. Write . . . or call him **TODAY!**



TOURNAROCKERS

FOR LOWEST NET COST PER YARD

hauled by **5 TOURNAROCKERS** *General Construction Co.*



2000 pay yds. per day moved by **4 C TOURNAPULLS**

While 5 Tournarockers were setting high production records on this Columbia River job, General Construction Company's 4 high-speed, electric-control C Tournapulls were moving dirt at an equally fast pace on another section of the project. Using a 144 h.p. pusher to load over 70' distances, each Tournapull heaped 10 pay yds. of moist silt-sand and gravel in 50 seconds . . . highballed 1300' to dump . . . spread over 60' in 20 to 25 seconds. Each Tournapull com-

pleted the 2600' cycle over extreme grades and rough, winding haul roads in 6 minutes . . . made 8.3 trips an hour . . . delivered 84 pay yds. That's 332 yds. hourly for the 4 Tournapulls . . . and checks with contractor's production records which show that on hauls ranging from 1000 to 4000' one-way, the 4 rubber-tired Le Tourneau rigs are averaging 250 cubic yds. an hour . . . 2000 yds. per 8-hour shift.



TOURNAPULLS

R. G. LeTOURNEAU, Inc., Peoria, Illinois

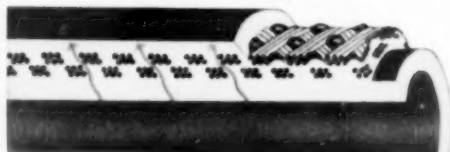
TOUGHER—from tube to cover

Condor Homoflex **HEAVY-DUTY AIR HOSE**



No other hose construction equals Condor Homoflex HEAVY-DUTY AIR HOSE for *flexibility* and *ability to cushion shock*. It's not just a matter of an extra thick cover to withstand the gouges of rock and the abrasion of dragging over rough terrain. Homoflex "toughness" is more than cover-deep, it is toughness through and through.

HOMOGENEOUS FLEXASTICS "THROUGH-AND-THROUGH"



The enlarged cross-section illustration of the Homoflex Hose wall shows how the cover, strength member, and tube are "fused" into one homogeneous unit. You can't

separate any part of this hose from another. It is this construction, with all the sinewy resilience of its strength member embedded in Flexastics that makes possible lighter weight, extreme flexibility and resistance to kinking, with no sacrifice of safe working pressure.

Contractors, quarries and mines have long called for better and more flexible hose to take the abuse of falling rock, sharp bends and rough handling. They can't "baby" hose. If it doesn't stand up, it is sometimes a risk to safety and always costly to replace. Condor Homoflex Heavy-Duty Air Hose has an oilproof tube, and is ideal for all heavy-duty mining, quarrying and construction work.

If you are not yet using Condor Homoflex Hose on your drills, get some from your nearest Manhattan Distributor. It's a good way to end hose kinking and assure peak drill production with a constant, full feed of air through the hose.

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY



RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

Query the Quarries...



... you'll find that leading quarry operators everywhere rate Bucyrus-Erie excavators outstanding for output, economy, and dependability in rock. See your Bucyrus-Erie distributor for full information on Bucyrus-Erie gas, diesel and single motor electric $\frac{1}{2}$ to 4 yard excavators.

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

212550C

**BUCYRUS
ERIE**

When you compare



KOEHRING

COMPANY
Milwaukee 16, Wis.

Subsidiaries: JOHNSON • KWIK-MIX • PARSONS

... measure by

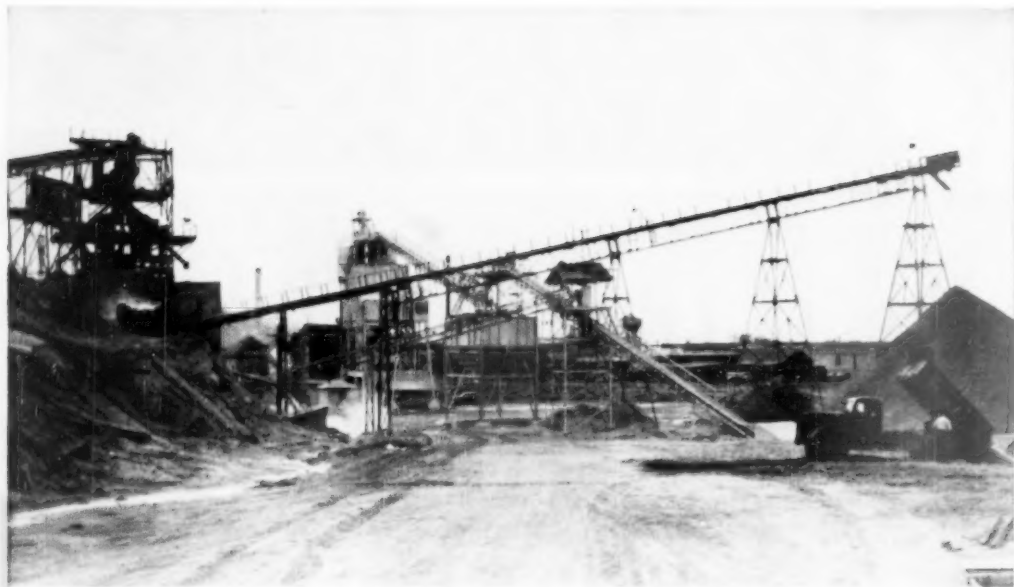


"KOEHRING WORK CAPACITY"

**Ask your Koehring
Distributor for
specific information**



7 $\frac{3}{4}$ to 79 $\frac{1}{2}$ TONS lift capacity . . . $\frac{1}{4}$ to 2 $\frac{1}{2}$ yards dipper capacity



Winner of the 880-Yard Run!

This half-mile long S-A conveyor system delivers gravel from pit to the scalping and washing screen house at substantial savings as compared to hauling the same material the same distance by truck. In addition, gravel is then conveyed to the screening and crushing plant and distributed to three separate storage points.

Such versatility in the applications of S-A equipment is typical of the resourcefulness of S-A engineers. They can draw on fifty years experience in finding the best answers to all types of sand and gravel handling problems. Because Stephens-Adamson makes all types of sand and gravel handling equipment, the S-A engineer is free to recommend the unit or units best suited to your specific needs.

If you plan a new or remodelled conveying system, write us today . . . you are not obligated.

UTAH SAND & GRAVEL PRODUCTS CORP. North Salt Lake City, Utah

Veteran S-A belt conveyor system at this plant transports gravel one-half mile from pit to plant and through processing to storage. S-A screens, feeders and gates are important plant components. The Ready-Mix Concrete plant in the background is a recent plant development and is served by an S-A reclaiming belt conveyor for sand and gravel and bucket elevator for handling cement. Stockpiling and reclaiming conveyors permit continuous peak production during the entire year.

STEPHENS-A-ADAMSON

7 Ridgeway Avenue, Aurora, Ill. MFG. CO. Los Angeles, Calif. • Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

Lab Tests Prevent Investment Loss...

How Allis-Chalmers Basic Industries Research Laboratory Minimizes Process Investment Risks

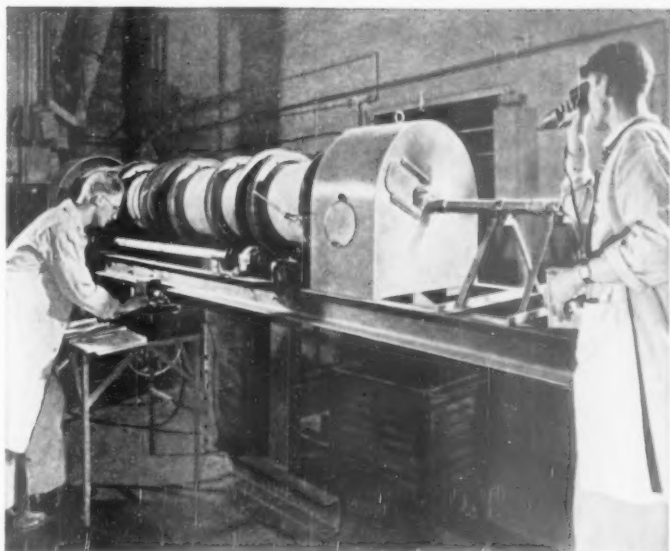
GODFREY L. CABOT, INC., manufacturer of carbon black, wanted to know if it was commercially practical to calcine a high volatile coke in order to obtain a low volatile and regulated density product.

Batch tests, which had been conducted by Cabot engineers, showed that the process had possibilities.

The problem was then brought to the Basic Industries Research Laboratory to determine whether or not the results of batch testing could be duplicated in a pilot rotary kiln.

Tests on pilot scale equipment proved that the process could be carried out profitably on a commercial scale in a rotary kiln and indicated the type and size machinery that would be required.

As a result, with this key problem solved, this processor was able to proceed with confidence in setting up full-scale operations.



Temperatures are being taken by optical pyrometer and thermocouples on 12 ft by 18-in. pilot mill rotary kiln in Basic Industries Research Laboratory.

The Allis-Chalmers Basic Industries Research Laboratory is primarily a service organization. It is manned by technically trained personnel and equipped with the necessary apparatus for investigating process problems that develop in the beneficiation of raw materials.



J. B. Calkins
Pilot Mill
Foreman

Laboratory services include research on the development of new or existing industrial processes . . . research on new machinery, or improvement of old machinery . . . fundamental research into the basic principles underlying modern mechanical, process or plant design.

The Laboratory's purpose is to de-

velop new or more efficient methods . . . to determine the economics of processes prior to full scale production . . . to provide engineering information that will guide in the designing of efficient processing plants.

CAN YOU USE THIS SERVICE?

The services of the Laboratory are available to anyone in industry, regardless of the nature of their processes. All investigations are treated in complete confidence. Information obtained is not made public except with express permission of the sponsor.

The Laboratory is a service organization; charges are based on costs. An estimate for test work can be obtained through your nearest Allis-Chalmers district office, or by writing direct to:

ALLIS-CHALMERS, 975A SO. 70 ST.
MILWAUKEE, WIS.

A-3155



Chemical analyses for control of pilot mill tests are made in this chemical laboratory.

ALLIS-CHALMERS



Basic Industries Research Laboratory — Dedicated
to a Better Utilization of Our Raw Materials

BUELL knows KILN DUST COLLECTION

that converts waste into dollars!

NOW YOU RECOVER MORE DUST RETURNED DUST NEEDS NO PRE-PROCESSING!

High cyclone efficiency—assured by Buell's exclusive van Tongeren "Shave Off"—boosts kiln dust recovery by tons. Harmless alkali passes through the collector. More "pure" dust is returned. No additional operation for alkali removal. The time and money Buell saves is quickly calculable!

BUELL CYCLONES CAN'T CLOG!

The secret is in the cyclone diameters. They are large! Can't clog! Not even at the outlets. The result? All cyclones in a Buell System operate with uniformly high efficiency—without interruption!

BUELL SYSTEMS SHOW NO WEAR!

Even after 12 years, Buell Systems recovering dust from pulverizers, kilns and driers, still operate with practically no maintenance. Responsible for this record are large-diameter cyclones, made possible by Buell design, that cut the abrasive effect of rock dust to the minimum. Down to zero go shutdowns and repairs!



buell

Engineered Efficiency in

Dust Recovery

Free literature will gladly consult with you on your dust recovery problems. Write today to: Buell Engineering Company, 70 Pine Street, Suite 200, New York 7, N. Y.

No obligation of course.

BUELL 'SF' Electric Precipitator

Kiln Dust Recovery may call for a Precipitator System, or one that combined both Cyclone and Precipitator. The Buell 'SF' reflects Buell's "Engineered Efficiency" in the collection and recovery of fine dusts, fumes and vapors.

BIG T7 TRAXCAVATOR

Keeps BIG quarry profitable

— for LATROBE CONSTRUCTION CO.,
LATROBE, PENNSYLVANIA

Ability to excavate hard clay landed this T7 TRAXCAVATOR the job of moving 100,000 cubic yards of dirt from a mile-long, 30-foot highwall. Then the big-capacity machine dug out a 2-foot-thick dirt layer, 400 feet wide and a mile long, at the base of the wall.

Owned by Latrobe Construction Co., Latrobe, Pennsylvania, this outfit also cleans up the quarry after blasts, loading shot-rock on trucks, and in its spare time loads stockpiled stone.

"If I didn't have this TRAXCAVATOR unit I couldn't keep this quarry working profitably," declares Quarry Superintendent.

Stamina to load, lift, carry and dump solid,

heavy quarry materials on a continuous production basis is built into every TRAXCAVATOR size. Frame structure and power unit, lifting arms and bucket, too, are built to absorb and resist the slam-bang shock, stress and abrasion of rock-quarrying.

Equip your quarry with the TRAXCAVATOR you need, making your selection from the only line with a full range of job-fitting sizes, (5 Models, 1 2 to 4 cubic yards capacity). See your TRACKSON—"Caterpillar" Dealer soon, or write direct to TRACKSON COMPANY, Dept. RP-120 Milwaukee 1, Wisconsin, for full information; no obligation.

THE ORIGINAL TRACTOR EXCAVATOR

One of the regular jobs for this T7 TRAXCAVATOR is cleaning up after blasts, at the quarry of Latrobe Construction Co., Latrobe, Pennsylvania.



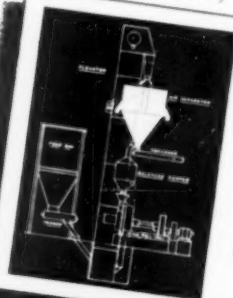
TRAXCAVATOR®

**The Original
Tractor Excavator**



Here's How STURTEVANT Air Separators Increase Production of Fines... Lower Separation Costs

- Sturtevant Air Separators effect production savings by increasing output by 25 to 300% ... reducing power consumption by as much as 50%.
 - They efficiently carry off all classified materials in any desired fineness from 40 to 325 mesh and finer ... eliminate the need of screening in certain applications.
 - Capacities available from $\frac{1}{4}$ to 50 tons per hr.
- Write for full details, today.*



Sturtevant Air Separator in "closed circuit" with pulverizer. This combination increases tonnage and reduces costs in all types of industry.

Sturtevant Mill Company

102-A Clayton Street, Boston 22, Mass.

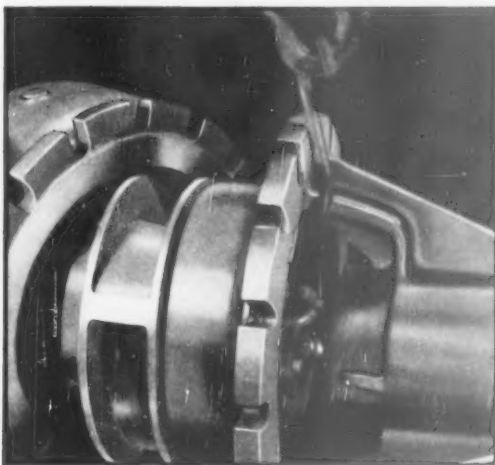
Designers and Manufacturers of CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

Remove Rotating Element in 5 Minutes!

**ALLIS-CHALMERS
SOLIDS HANDLING
PUMP**



- 1. Remove Casing Bolts** lift and disconnect drive. Just loosen bolts and bolt assembly from slot. Bolt, nut and washers are still connected for easy reassembly.



- 2. Swing Out Rotating Element.** Neither suction nor discharge piping need be disturbed. All wearing parts are fully accessible for inspection or servicing.

THE PUMP IS BACK IN SERVICE IN LESS THAN A HALF HOUR

QUICK, EASY SERVICE AND LONG RUNS between servings are the two things operators want most in solids handling pumps. You can see for yourself how quick and easy service is with an Allis Chalmers Solids Handling pump.

You get long life, too, because Allis-Chalmers Solids Handling Pumps are made of special hard *Allisite* alloy . . . because they have thick sections and heavy parts throughout . . . and because they are application engineered by specialists who know solids handling problems and how to solve them.

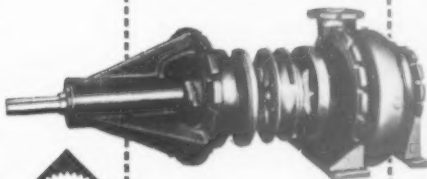
Get complete information on Allis-Chalmers Solids Handling pumps from your nearest Allis-Chalmers Sales Office. Or write for Bulletin 08B6381.

ALLIS-CHALMERS, 975A SO. 70 ST.
MILWAUKEE, WIS.

A-3216

Allisite is an Allis-Chalmers trademark.

ALLIS-CHALMERS



ONLY FIVE WEARING PARTS

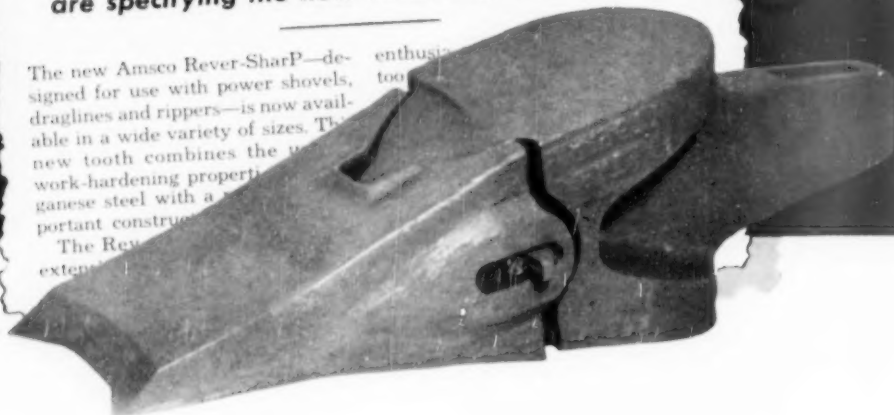
Shaft sleeve, impeller,
casing, two wear plates.
All easy to handle and
easy to replace.

Completely New Tooth Has 6 Major Features

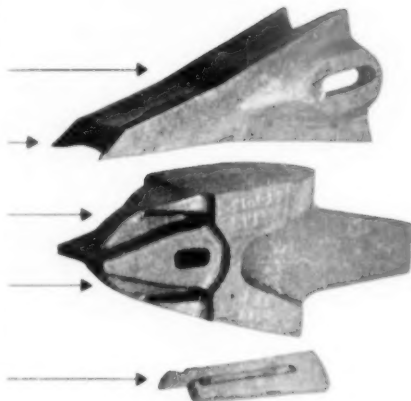
More and more operators of excavating equipment
are specifying the new AMSCO® Rever-SharP

The new AmSCO Rever-SharP—designed for use with power shovels, draglines and rippers—is now available in a wide variety of sizes. This new tooth combines the work-hardening properties of manganese steel with a important construction. The Rever-SharP extends its life by

enthusiastic
tooth



- 1. Manganese Steel Construction throughout**—The Rever-SharP actually thrives on hard use . . . *the harder you use it, the harder it gets!*
- 2. Reversible Tip**—when the cutting edges of the Rever-SharP are finally worn, simply turn the tip over. *It's self-sharpening.*
- 3. Reinforced Cutting Edges**—specially designed extended corners are the first to work-harden, thus equalizing wear along the entire length of the cutting edge.
- 4. Heavy, Rugged Adaptor**—extra metal protects base connections and lips. Now available for all base connections.
- 5. Reinforced Adaptor Nose**—supported by ribs along entire length, making bending or breakage practically impossible. Special taper makes lips self-tightening during use.
- 6. Tapered Lock-Key**—easy to insert and remove. Has rubber insert—can't work loose in service.



Enthusiastic users of the new Rever-SharP report higher digging efficiency—and as much as 5 times longer tooth life. *It's a new development worth investigating—write today for the complete facts!*

AMERICAN

Brake Shoe

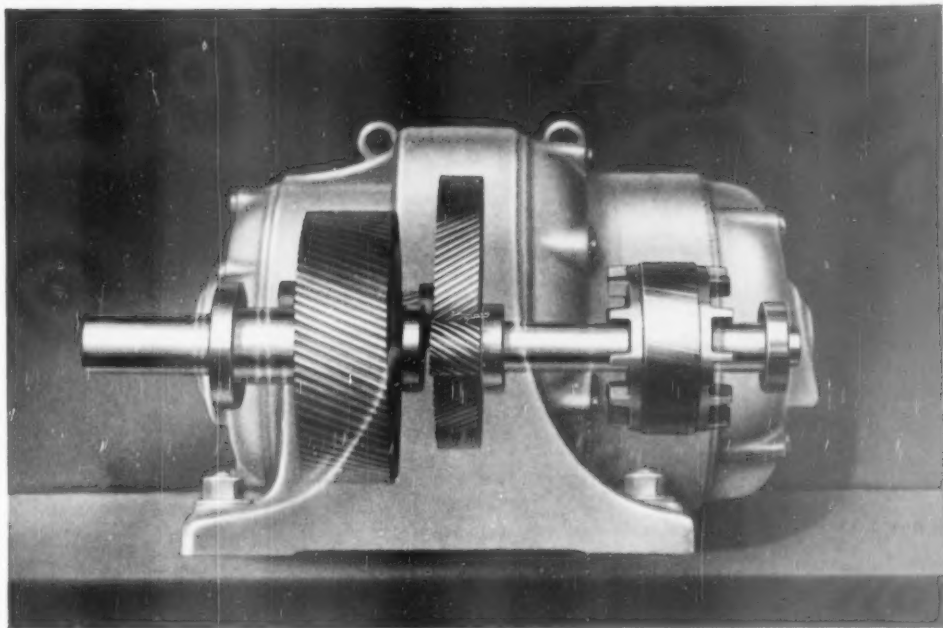
COMPANY

AMERICAN MANGANESE STEEL DIVISION

377 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis, in Canada: Joliet Steel Division, Joliet, Que.

REPLACE YOUR EXPOSED MOTORS WITH **SYNCRGEAR**



Diaphanous view of U. S. Syncrogear Motor

THE MOTOR THAT'S GEARED TO ROCK PRODUCT CONDITIONS

Housed for dustiest locations.

Multiplied torque for overloads.

No cumbersome, external gearing.

Completely sealed oil and gear chamber.

Asbestos-protected windings.

MOTORS FAIL in Rock Products plants because of exposure to dirt, dust and moisture, and because overloads impose too much burden. The motor slows down. That means lost production. The motor heats up. That's bad for the windings and leads to a burnout. Now, by installing a U. S. Syncrogear Motor you get multi-protection. The

Syncrogear needs no cover. It's streamlined and housed to ward off dust, dirt, drippings. Its gear train is self-contained within a ruggedly designed pyramidal case. So no external gear box and connecting belts and pulleys are required. Torque is greatly multiplied, so there's no lag in speed when handling peak loads. You save power and space. Burnouts are avoided because every U. S. Motor is asbestos-protected. The Syncrogear gives you a complete, dependable "power package" of two machines in one—motor and gear train best suited to Rock Product conditions. Single, double and triple reductions, $\frac{1}{4}$ to 30 h.p. Variable speed too, if desired, up to 50 h.p.

KEEP YOUR ROCK PRODUCT OUTPUT AT TOP CAPACITY, ECONOMICALLY WITH

U. S. SYNCRGEAR MOTOR

(Turn to next page)



Syncrogear operating bucket conveyor carrying dry, dusty ceramic clay in parking room.

**DEEP IN DUST
BUT NO HARM TO MOTOR**

**The sealed
SYNCRGEAR
is self-protecting
under worst conditions**

U. S. SYNCRGEAR MOTORS—10 TO 10,000 RPM

Syncrogears are well housed—the ideal motor for dusty conditions. The gear train is sealed. No dust or grit can intrude. The motor housing is streamlined. You don't have to put a cover over it. No external gear boxes are required. You can have any gear ratio desired up to 262 to 1. The Syncrogear can be used to power most of your equipment such as Agitators, Asphalt Mixers, Ball Mills, Blowers, Centrifuges, Conveyors, Cranes, Crushers, Dehydrators, Dryers, Exhausters, Fans, Grinding Mills, Hammermills, Hoists, Hoppers, Kilns, Loaders, Mixers, Pulverizers, Screens, Slurry Mixers, Tramways, Vibrators and Winches.



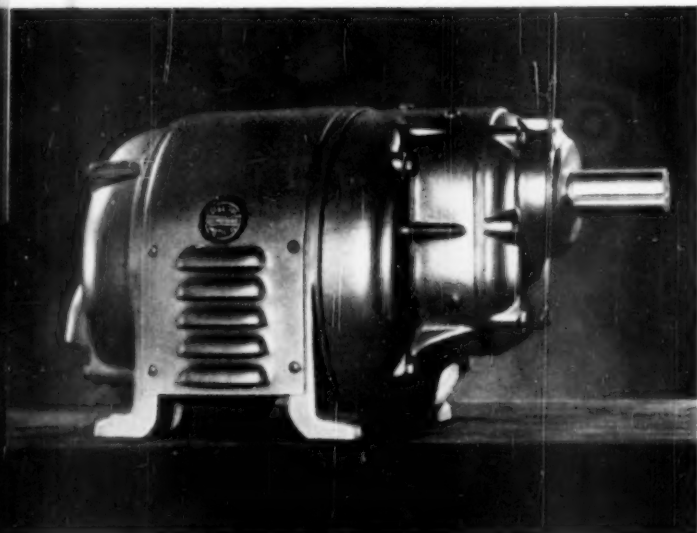
This Syncrogear operates blower on a movable drying kiln, in dust and dirt.

**ALL U.S. MOTORS
embody these plus-values**

ASBESTOS-PROTECTED WINDINGS
NORMALIZED CASTINGS
LUBRIFLUSH LUBRICATION
(OR) SEALED LUBRICATION
STREAMLINED, DRIP-PROOF DESIGN
CENTRIFUGALLY CAST ROTOR
DUAL BLAST VENTILATION
GENUINE AUTOSTART ACTION

ASK FOR DESCRIPTIVE BULLETIN

We have prepared an interesting Bulletin featuring U. S. Syncrogear Motors in various types and capacities for Rock Products plants. It's free. Request a copy.

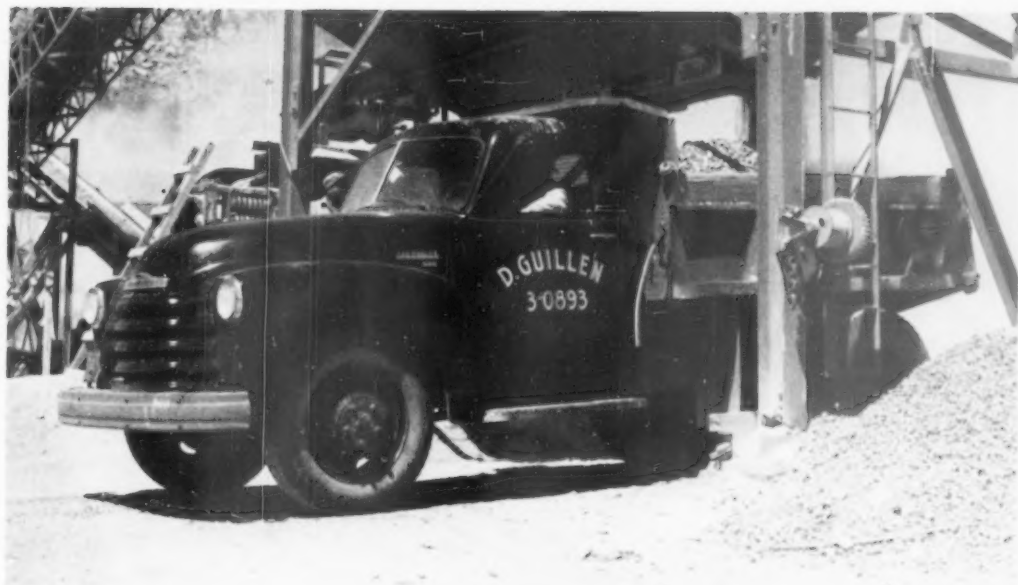


Type GM—Single Reduction Design and Speed Increaser

U.S. ELECTRICAL MOTORS Inc.

PACIFIC PLANT: Los Angeles 54, Calif. • ATLANTIC PLANT: Milford, Conn.

Atlanta 3, Ga.; Bakersfield, Calif.; Boston 16, Mass.; Chicago 8, Ill.; Cincinnati 16, Ohio; Cleveland 14, Ohio; Dallas 9, Texas; Detroit 2, Mich.; Fresno 1, Calif.; Houston 4, Texas; Indianapolis 4, Ind.; Milwaukee 2, Wisc.; Minneapolis 2, Minn.; New York City 6, N. Y.; Philadelphia 2, Pa.; Pittsburgh 2, Pa.; Seattle 4, Wash.; San Francisco 7, Calif. Distributors and Agents in all principal cities.



Choose from America's Greatest Truck Values!

CHEVROLET ADVANCE- DESIGN TRUCKS

You're right in every way when you choose Chevrolet trucks as your on-the-job partners. Chevrolet offers you more—in power for the job, economy of operation, low maintenance costs.

Economy-wise—you're right in choosing Chevrolet. You save money, for Chevrolet is the lowest priced line of all. And you save on gas, oil and upkeep with these trucks so famous for all-around economy.

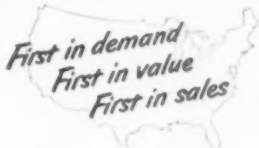
Power-wise—you get more with Chevrolet, too. Chevrolet's great valve-in-head engine is the result of 38 years of steady improvement—an engine that offers outstanding pulling power combined with

dependability and long service at low cost.

Job-wise—you're right with Chevrolet. There's a Chevrolet truck to fit *your* job . . . with the right power, the right clutch, the right power-train to fit the need. And every unit of the Chevrolet truck you select is *engineered* for the job. Yes, to *do* your job right—with outstanding efficiency and economy.

Before you buy, get all the facts on Chevrolet—first-cost, operating cost and maintenance cost. Remember: For the last eight consecutive truck production years, users have purchased more Chevrolet trucks than any other make. See your local Chevrolet dealer now!

CHEVROLET MOTOR DIVISION, General Motors Corporation, DETROIT 2, MICHIGAN



Only Chevrolet Trucks Give You All These Advance-Design Features:

• **TWO GREAT VALVE-IN-HEAD ENGINES:** the 105-h.p. Loadmaster or the improved 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • **POWER-JET CARBURETOR**—smoother, quicker acceleration response • **DIAPHRAGM SPRING CLUTCH** for easy-action engagement • **SYNCHRO-MESH TRANSMISSIONS** for fast, smooth shifting • **HYPOID REAR AXLES**—for dependability and long life • **DOUBLE-ARTICULATED BRAKES**—for complete driver control • **WIDE-BASE WHEELS** for increased tire mileage • **BALL-TYPE STEERING** for easier handling • **UNIT-DESIGN BODIES**—for greater load protection • **ADVANCE-DESIGN STYLING** for increased comfort and modern appearance.

1939

1940

1942

1949→

4

Austin-Western CRUSHING PLANTS

for Arthur & Allen
of Pueblo, Colorado

Crushing slag from the Colorado Fuel & Iron Company's Pueblo plant to produce ballast for the Santa Fe, Missouri Pacific and Rock Island Railroads.

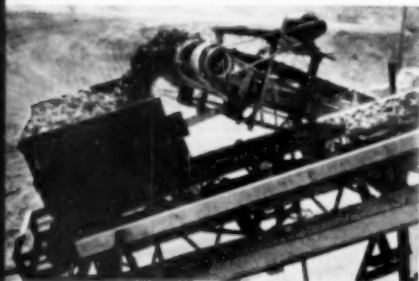


The man at the feed conveyor in the foreground is salvaging iron from the slag.

This, the fourth Austin-Western Crushing and Screening Plant purchased by Arthur & Allen over a ten-year period, has an average run of 350 tons per hour and has reached a peak output of 420 tons per hour. The finished product is, in almost all cases, $1\frac{1}{2}$ " minus to $\frac{3}{8}$ " plus. The percentage of crush is approximately 60.

Whatever your production requirements, an Austin-Western Plant, designed and tailor-made to meet them, will do the same sort of outstanding job for you. Let's talk it over.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U.S.A.



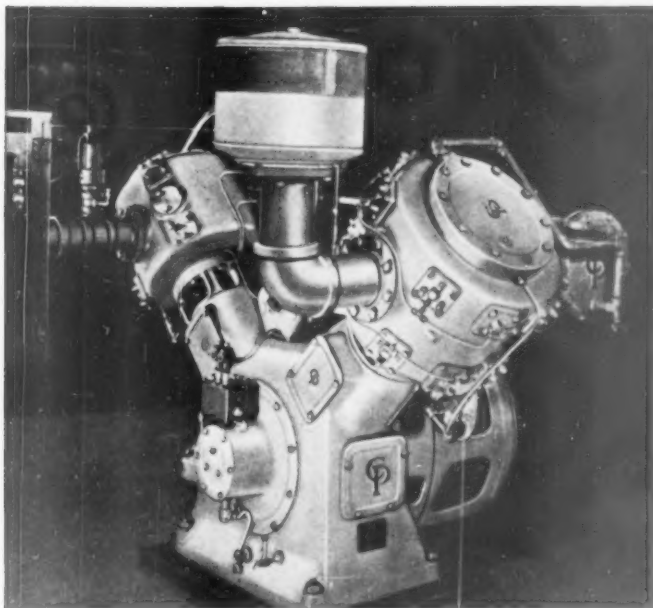
These conveyors are carrying the combined output of jaw and roll crushers.



The loading hopper is arranged to accommodate two trucks at one time.

BUILDERS OF ROAD MAINTENANCE
Austin Western
SINCE 1909





here's the answer to restricted floor space —the Type Y Compressor

While its compact design makes it ideal for close quarter installation—it has plenty of other outstanding advantages.

It is shipped intact as a "package unit," ready for external connections.

It requires only a simple foundation and no special skill is needed to align and install it.

It operates at high efficiency because of such valuable features as large area Simplate valves, multi-step capacity regulation, effective inter-cooling, precision bearings and force-feed lubrication.

And finally it's extremely easy on maintenance.

Available with built-in or direct-coupled motor, or with V-belt drive, in capacities of 500 to 900 c.f.m., at 30 to 125 pounds pressure. Sizes for other pressures also furnished.

Write for full information.



**CHICAGO PNEUMATIC
TOOL COMPANY**

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

UNDERGROUND, OR . . .

IT'S JOY EQUIPMENT



Above: For high production loading and hauling of rock and ore, Joy teams of trackless loaders and electric or diesel shuttle cars get the call underground.

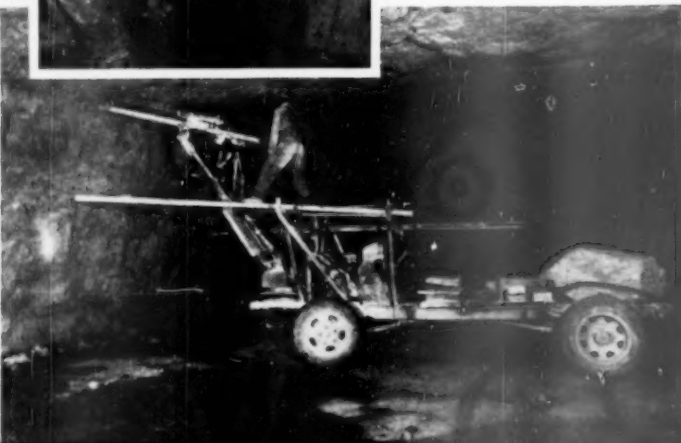
Right: Complete range of Joy Supers includes the new S-91T, with telescopic feed. Requires fewer steel changes, gives more time for drilling.

Below: Joy Wagon Drill specially adapted to drill at any height from toe holes to horizontals 9' high.



Left: The Joy HS-15 high speed drill for underground blast holes, or core drilling to 500'. Compact and easy handling, with "in-line" vibrationless drive.

Below: Joy Hydro Drill rigs are versatile units, can be mounted as required to suit individual needs. This truck-mounted rig is an example.



Right: The Joy Drillmobile, a twin-boom, self-propelled, highly maneuverable machine, gives you maximum footage at least cost per foot of hole. Features Joy Hydro Drill ribs for fast, accurate hole-positioning, and remote control.



...ON THE SURFACE

FOR GREATER TONNAGE FOR LOWER COSTS



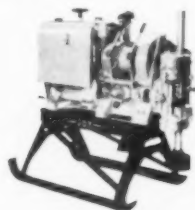
Above: Joy builds a complete line of "Silver Scream" Hand Tools, cadmium-plated for rust protection and easier running in.



Above: Joy Wagon Drills (Medium and Light-weight models) are easily maneuvered units with positive locking brakes for quick set-ups and balanced drilling on any terrain.



Above: Joy Champion Rotary Drills set absolutely new standards in high-speed, economical blast hole drilling, far out-performing all others. Built in two self-propelled models, for diesel, gasoline engine or electric motor drive.

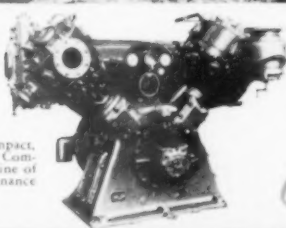


Above: Joy Core Drills range in capacity from 250 to 1750 feet of 1 1/2" hole. Screw feed or hydraulic types—gasoline, diesel, air or electric drive.



Left above: Joy's popular Series 80 Portable Compressors, with the famous "Econo-Miser" load control, are built in seven sizes, from 60 to 630 C.F.M.

Above: Joy Hydro Drill Jibs are readily adaptable to truck mounting, etc. for secondary drilling or toe-holes in quarries or open-cut mining.



Right: Joy pioneered the compact, modern "package-type" Air Compressor—offers a complete line of highly efficient, low maintenance airplants up to 3656 C.F.M.

Consult a Joy Engineer

WHD M. 2365

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING • PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO



1939

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1942

1949→

4

Austin-Western CRUSHING PLANTS

for Arthur & Allen
of Pueblo, Colorado

Crushing slag from the Colorado Fuel & Iron Company's Pueblo plant to produce ballast for the Santa Fe, Missouri Pacific and Rock Island Railroads.



The man at the feed conveyor in the foreground is salvaging iron from the slag.



These conveyors are carrying the combined output of jaw and roll crushers.

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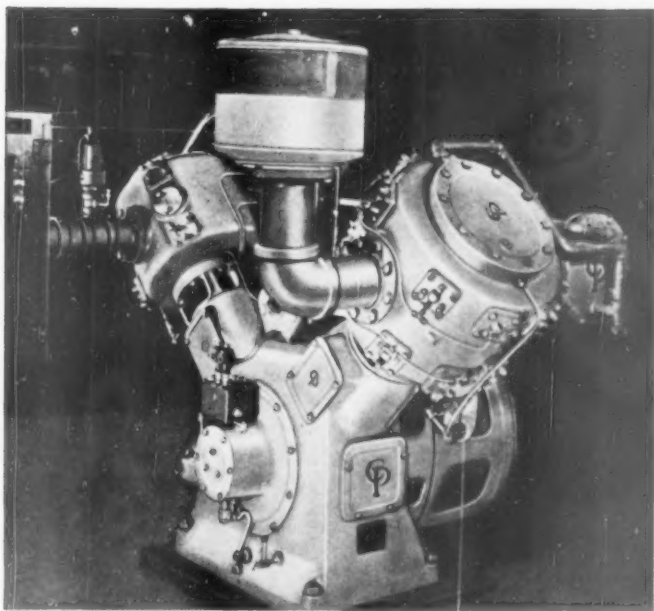
AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U.S.A.



The loading hopper is arranged to accommodate two trucks at one time.

BUILDERS OF HEAVY MACHINERY
Austin Western
SINCE 1887





here's the answer to restricted floor space —the Type Y Compressor

While its compact design makes it ideal for close quarter installation—it has plenty of other outstanding advantages.

It is shipped intact as a "package unit," ready for external connections.

It requires only a simple foundation and no special skill is needed to align and install it.

It operates at high efficiency because of such valuable features as large area Simplate valves, multi-step capacity regulation, effective inter-cooling, precision bearings and force-feed lubrication.

And finally it's extremely easy on maintenance.

Available with built-in or direct-coupled motor, or with V-belt drive, in capacities of 500 to 900 c.f.m., at 80 to 125 pounds pressure. Sizes for other pressures also furnished.

Write for full information.



**CHICAGO PNEUMATIC
TOOL COMPANY**

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



Norblo

Dust and Fume Collection . . . Engineered, Efficient, Economical

Shown above are three distinct types of modern dust and fume collecting equipment — Centrifugal, Hydraulic, Bag types. These three types used in combinations provide the better, more economical and more efficient solutions of a wide range of dust and fume control now demanded by modern large scale industries in the smelting, rock products, chemical, milling and processing fields.

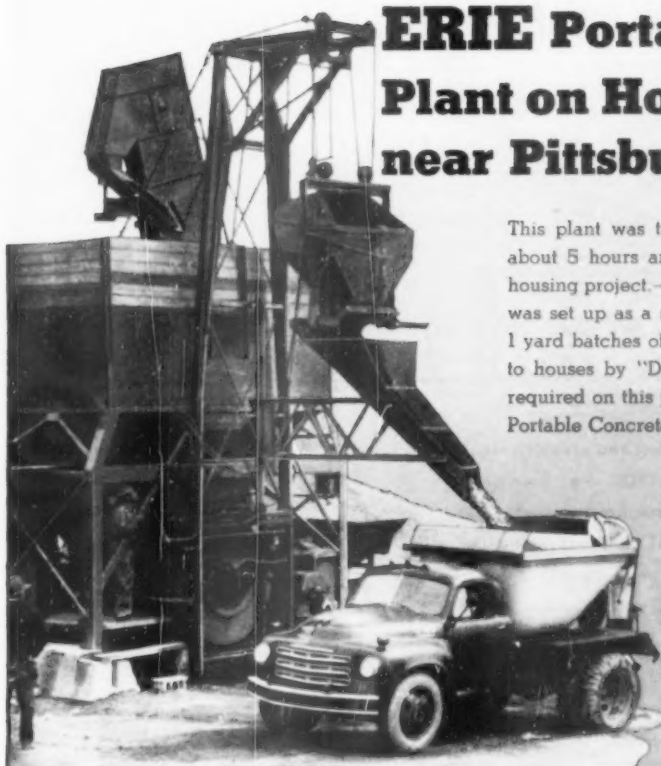
Though Norblo equipment of all three types is available in a wide range of c.f.m. capacities, Norblo is outstanding for larger, heavy duty installations.

For detailed information on each of the types shown above ask for Bulletin No. 104-2 covering centrifugal and hydraulic, or Bulletin 164-2 for automatic bag type collectors. Also available, Cement Air Cooling Bulletin No. 165-1, and complete catalog of fans No. 1002-4.

THE NORTHERN BLOWER COMPANY

6408 BARBERTON AVE. • CLEVELAND 2, OHIO

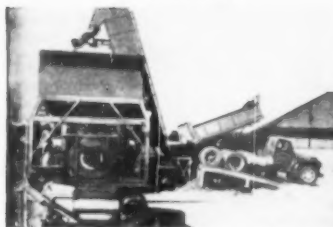
ERIE Portable Concrete Plant on Housing Project near Pittsburgh



This plant was towed from Erie to Pittsburgh in about 5 hours and set up on the site of a large housing project.—Wheels were removed and plant was set up as a stationary concrete mixing plant. 1 yard batches of specification concrete delivered to houses by "Dumpcrete" trucks. All concrete required on this project was provided by this Erie Portable Concrete Plant.

Move Your
CONCRETE PLANT
from Job to Job
and produce up to
40 CU. YARDS
PER HOUR

In Illinois



This Erie Portable Concrete Plant, electric motor driven, is set up in a town of 10,000 population to supply concrete within a 16 mile radius. Steam heating makes it possible to operate all year and sales up to 100 yards a day are recorded without taxing the full capacity of the plant.

In Transit



The above Erie Portable is being towed 100 miles to make concrete on a series of building projects. 2 men can get it into operation within 60 minutes and it can be "knocked down" for towing in less time. Booklet SPI gives complete specifications. Write for copy.

In New York



This Erie Portable Concrete Plant is completing here a 6000 cu. yard concrete job and has since been moved to three building sites in Buffalo. Consult with Erie for complete details on the Erie Portable Concrete Plant as applied to your concrete project.

ERIE

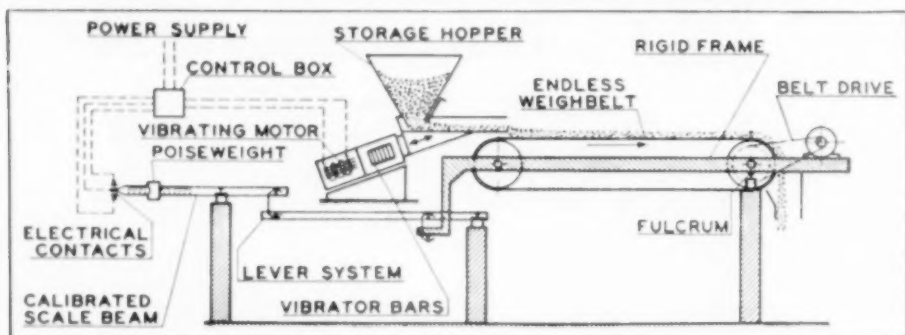
STEEL CONSTRUCTION COMPANY

712 GEIST ROAD

ERIE, PENNSYLVANIA

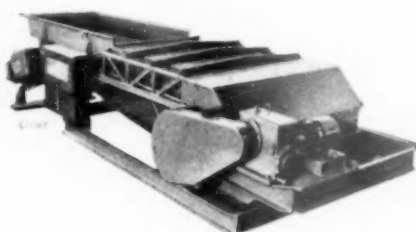


CONTINUOUS GRAVIMETRIC FEEDING ACCURATE FLEXIBLE



(PATENTED)

For accurate weighing, feeding, batching and proportioning there is this Jeffrey-Traylor WAYTROL — a precision machine with rate of delivery automatically regulated. Control is electrical and instantaneous. Compensating for error, the WAYTROL provides a system of continuous weighing, following exactly the theory of precision of measurement upon which it is based. Let us tell you more about this unit with the "Electric Brain."



TYPE 450 WAYTROL

Partial List of Materials being fed by WAYTROLS

Activated Carbon	Coal	Iron Borings	Sand
Alum	Coke	Iron Ore	Shale
Ammonium	Explosives	Limestone	Soda Ash
Sulphate	Feldspar	(crushed)	Starch
Bauxite	Fluorspar	Limestone	Talc
Borax	Food Products	(pulverized)	Tobacco
Cement Clinker	Fullers Earth	Pebble Lime	Wood Chips
Cement (finished)	Gypsum	Plastics	Wood Flour
Chemicals	Glass Cullet	Potash	Zinc Ore
Clay	Hydrated Lime	Salt Cake	

SIZES AND CAPACITIES

Type	Capacity per hour (based on 100 lb. Granular Material)		Feeder HP	Shipping Weight Lbs.
	Minimum	Maximum		
11E	60 lbs.	6,000 lbs.	1/16	1,050
220 AC	300 lbs.	15,000 lbs.	1/4	1,800
220 MC	300 lbs.	30,000 lbs.	1/2	1,900
330	1,000 lbs.	100,000 lbs.	1	3,800
450	2,000 lbs.	200,000 lbs.	1	6,000
5080	5,000 lbs.	500,000 lbs.	2	12,000

ELECTRIC
VIBRATING }

Feeders
Coolers

Conveyors
Packers

Bin Valves
Screens

Dryers
Waytrols

Bin-Level Controls
Mixers

THE JEFFREY

MANUFACTURING COMPANY Established 1877
939 North Fourth St., Columbus 16, Ohio

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Beckley, W. Va.
Birmingham 3
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Jeffrey Galion (Pty.) Ltd., Johannesburg, S.A.
The Ohio Malleable Iron Co., Columbus, Ohio

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Detroit 13
Harlan, Ky.
Houston 2

Jacksonville 2
Milwaukee 2
New York 7
Philadelphia 3
British Jeffrey Diamond Ltd., Wakefield, England
The Galion Iron Works & Mfg. Co., Galion, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio

Pittsburgh 22
St. Louis 1
Salt Lake City 1
Scranton 3

Complete Line of
Material Handling,
Processing and
Mining Equipment



ROCK RATED!



THE NEW

P&H

MODEL 955-A (2½ YDS.)

with **MAGNETORQUE*** swing

Watch this new machine get its teeth into a rock job and see what "rock-rated" really means to you. It's *designed* . . . every inch from boom point to crawler shoes . . . to make rock handling easier . . . more profitable for you.

Unbeatable—point for point

P&H Magnetorque eliminates swing friction clutches . . . their troubles and replacement costs. It gives you smoother, faster swings . . . for the life of your machine.

Greater Stability gives you more power at the tooth point . . . and greater work capacity.

Direct Acting Hydraulic Control . . . easier on machine, easier on operator . . . smoother and greater holding power through full wrap brakes and clutches.

*Trade-Mark of Harnischfeger Corporation for electro-magnetic type clutch.

P&H Rapid Reversing Planetary Chain Crowd gives you snappier dipper action. It's more accurate. And crowd chain outlasts 25 to 30 crowd cables.

Get the facts about P&H all-welded strength and Added Values! The 955A is a 2½ yd. version of the P&H 1055 (3 yd. shovel) . . . the machine that has set new low-cost production records everywhere. Write for Bulletin X122, today.

P&H

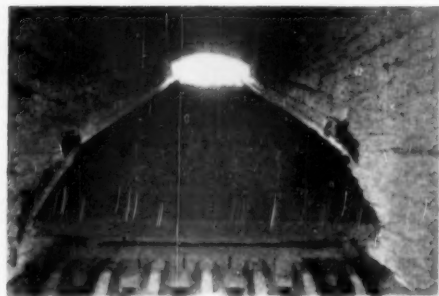
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COOL JUDGEMENT ON A HOT QUESTION



Fuller Inclined-Grate
Clinker Cooler

Here's what a FULLER Inclined-Grate Clinker Cooler gives you:

Uniform Air Quenching
Efficient Heat Recuperation

Lower Fuel Costs
High-Temperature Combustion Air

Better Clinker Grindability

And here's what it all adds up to: a completely reliable job of clinker cooling. Air quenching alone results in a better control over proper compound formation in this thermo-chemical process . . . and in combination with the other FULLER features for economy, assures improved quality at lower operating costs.

FULLER has been engineering and building equipment for the Cement Industry for a

quarter of a century. Every installation is the direct result of this long, broad range experience . . . every installation is designed to operate at maximum efficiency with minimum maintenance. A FULLER Engineer will confer with you on any problem of materials cooling or handling. His advice is sound . . . and may prove the means of materially increasing your profits.

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COMPRESSORS AND VACUUM PUMPS—
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Allis-Chalmers **HD-20** Hydraulic Torque Converter Tractor



● **BIG AND RUGGED** . . . 41,800 lb. of properly balanced weight . . . long, wide, sure-gripping tracks. Handles the toughest jobs in stride!

● **POWERFUL** . . . Newest, latest GM 2-Cycle Diesel Engine; Model 6-110. Plenty of POWER . . . for longer life, lower maintenance, increased production.

● **HYDRAULIC TORQUE CONVERTER DRIVE** that eliminates most gear shifting and keeps tractor working smoothly at higher average speeds.

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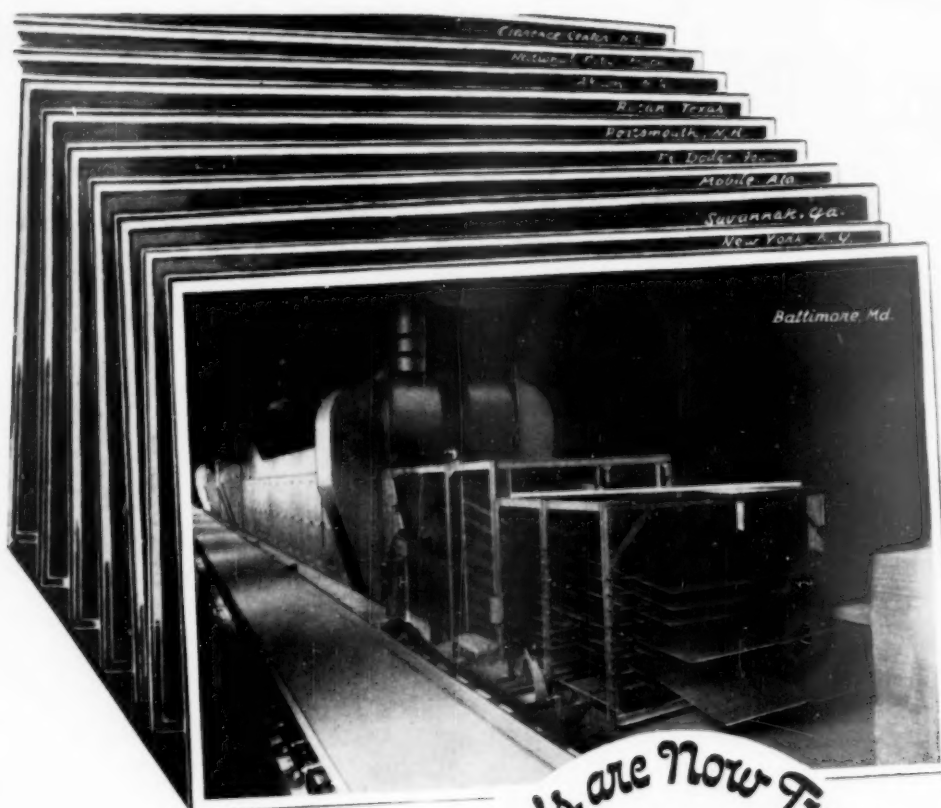
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Wheels are Now Turning
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Board Dryer

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NORDBERG "KNOW-HOW and MACHINERY" have been selected again for an essential and important crushing operation,—this time by E. K. I., of TURKEY, the predominant Coal Mining group whose extensive workings in the Zonguldak Coal Basin on the North Coast of Turkey, overlooking the Black Sea, are being modernized and improved through a vast mechanization and electrification program to double the annual coal output of the country.

An unusual feature of this undertaking is the plant which is being provided to reduce the hazard of spontaneous combustion and dreaded black damp,—through hydraulic backfilling of the spent workings.

To assure an adequate and steady flow of "backfill" aggregate, a completely NORDBERG-equipped plant to produce 6,000 tons per day of "finely crushed hard rock" is being installed. This involves PRIMARY and SECONDARY CRUSHERS, SCREENING UNITS, a well designed materials handling system with provision for surge and feed control, and adequate facilities for servicing and maintenance of equipment. The basic Crushing Plant units include a 30" Nordberg Heavy Duty Primary Gyratory Crusher, two 4 1/4' Symons Cone Crushers, and two 5'x8' Symons Rod Deck Vibrating Screens.

For large or small operations,—whether such be mineral reduction, base or precious metals, public works projects, or commercial aggregate production—you can depend on NORDBERG EQUIPMENT to deliver maximum output at lowest possible cost.

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MS06

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Primary
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Vibrating
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Symons Rod
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Mills



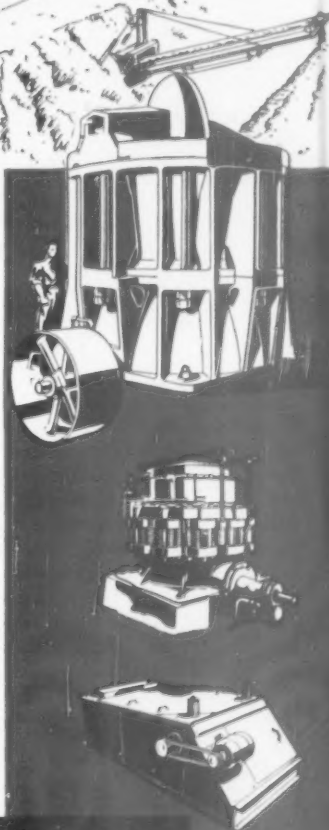
Mine Hoist



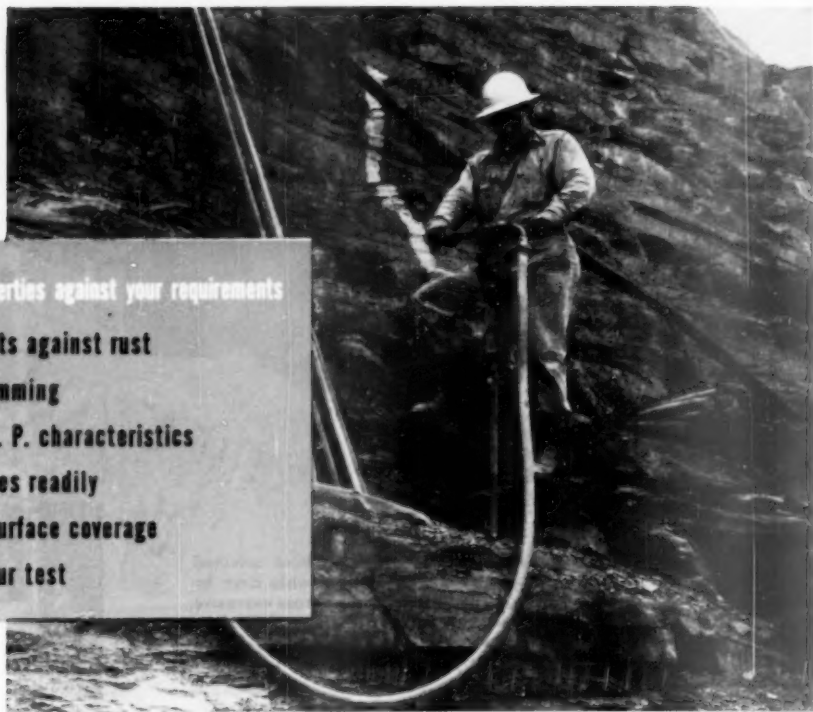
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6000 - Ton - Per - Day
Rock Crushing Plant
Preparation of
Mine "Backfill" Ag-
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Avoid gum and rust in your air-operated tools with **Gulf Rock Drill Oil**



Check these properties against your requirements

- Protects against rust
- Nongumming
- Good E. P. characteristics
- Atomizes readily
- Good surface coverage
- Low pour test

Gulf Rock Drill Oil keeps air tools clean as a whistle—free of gum and rust. Here's why! Gulf Rock Drill Oil contains an effective corrosion inhibitor that keeps moisture from contacting the metallic surfaces—there's no rust to foul up movement of internal parts.

And because it has exceptional resistance to oxidation, Gulf Rock Drill Oil does not form gummy deposits. Thus air tools retain their efficiency longer, and the need for dismantling, cleaning, and repairs is reduced.

Then too, Gulf Rock Drill Oil provides out-

standing protection against wear. It has good surface wetting ability — covers completely — and has high film strength.

Gulf Rock Drill Oil has the proper viscosity for this service—atomizes properly in air line oilers—and has a very low pour point. Its use insures cleaner tools, fewer repairs, and lower costs for maintenance.

For further information on Gulf Rock Drill Oil and for expert help on the lubrication and maintenance of other types of quarry equipment, call in a Gulf Lubrication Engineer today.



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Located in principal cities and towns throughout
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How the BWH ROTOCURE PROCESS eliminates OCS*

— a major cause of Premature Belt Failure



IN every 30 to 40 feet of belting cured by the flat press method, there's a 2" to 4" danger zone which often means trouble ahead. These zones consist of overcured or doubly cured segments — the result of "stop and go" vulcanization in which the previously cured portion is advanced less than a press length. These overcured sections constitute a mere 1/240th to 1/90th of the belt but invite serious surface wear and structural weaknesses that can cause early failure of the entire belt!

Not so with BWH ROTOCURED belts, however. They are the only belts made by a continuous, never-ending curing technique. THERE ARE NO OVERCURED SEGMENTS. ROTOCURE (even, uniform cure) benefits users 4 specific ways as it steps up efficiency and cuts belt maintenance costs. RESULT: LOWER COST PER TON OF MATERIAL CONVEYED!

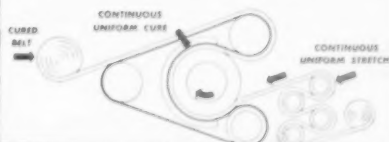
1. Because there is no double vulcanization, uniform abrasion resistant covers are always assured.
2. Continuous vulcanization eliminates overlaps which can reduce flex life up to 40%.
3. Mechanical distortion (inherent with flat press curing at the press ends) is eliminated.
4. Constant, uniform stretch results at all times.

BWH ROTOCURED BELTS will give you appreciably longer performance, lower your costs and spare you maintenance headaches. Remember, only BWH Conveyor belting offers you the decided advantage gained through the exclusive ROTOCURE PROCESS.

P. S. If you're interested in transmission belting, look to BWH and ROTOCURE for all the above PLUS advantages! BWH transmission belts have a higher coefficient of friction because dusting agents are not required. RESULT: belt tensions are minimized and belt life is extended.

* "Overcured Sections." You won't find them in BWH Rotocured Process Belts. These critical sections are present every 30' to 40' in all belts made by the flat press process. Only Rotocuring eliminates this cause of belt failure.

DIAGRAMATIC SKETCH OF EXCLUSIVE ROTOCURE PROCESS



Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

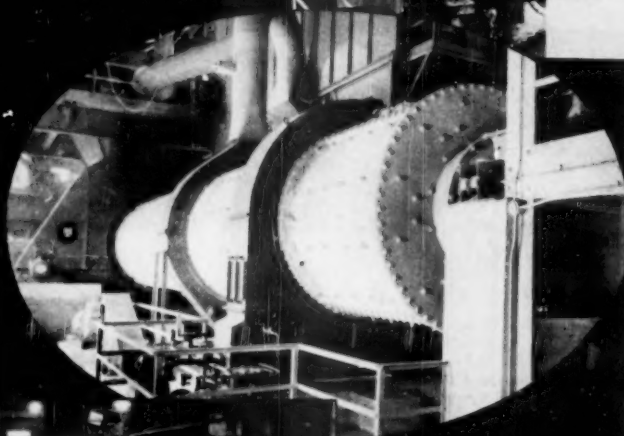
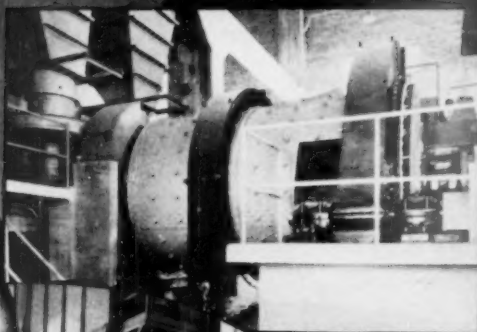
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ROCK PRODUCTS, December, 1950

GRINDING MILLS

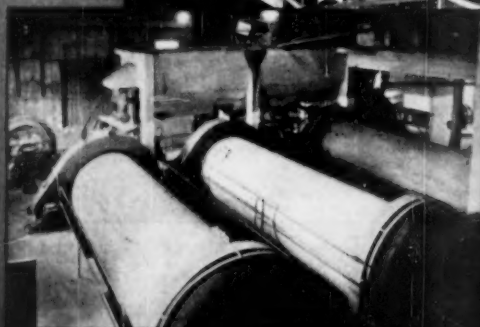
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Engineers

NEW YORK, N. Y.

"WE HEAR..."

December, 1950

At the end of the first four months of the Highway Research Board's road test in Maryland to determine the effect heavy axle loadings have on pavement disintegration, results seem to point to engineers' contentions that excessive axle loading does hasten destruction. As an example, two trucks with a tandem-axle load of 32,000 lb. caused 249 ft. of cracking in nearly 84,000 trips. Another pair of trucks on the adjacent lane, each having a tandem-axle loading of 44,800 lb., produced 2968 ft. of new cracks in less than 82,000 applications.

Two Indiana truck drivers have been convicted of operating overweight trucks after losing a plea that the state truck weight law was unconstitutional. They had argued that state police, by conducting truck-weighting tests, were making unlawful search of property without a proper warrant. The court held that investigation of truck weight does not constitute unlawful search.

A federal air pollution control bill is in the making, according to an article in Chemical Engineering. Though no specific anti-pollution bill is now before Congress, a number of bills are being drawn up which may pave the way for a future air pollution control law.

Despite a decline in farm income and in prices received by farmers, the overall fertilizer consumption in 1949 revealed an increase of 3.4 percent over the preceding year, according to the National Fertilizer Association. This means that the fertilizer industry has registered its 11th consecutive annual increase in shipments since 1939.

A new system of mixing concrete, claimed to be an improvement over the usual mixtures, has been described by a Housing and Home Finance Agency report. According to the government agency, a yeast ingredient is used which causes the concrete to expand up to about 350 percent. The material is a foamed cement product, composed of portland cement and various organic and inorganic materials. These are mixed in a special generator and the slurry pumped into place. It has a low density with excellent thermal properties, it is said. The new method, called Thermo-Con, was developed by Andrew J. Higgins, Sr., Higgins Resources, Inc., New Orleans, La. A few projects have already been completed using the new process.

The Minnesota State Highway Commission recently called bids for 17 highway construction projects estimated to cost in all approximately \$2,700,000. The work will provide improvements for about 54 miles of state trunk highways.

The Bureau of Public Roads has released preliminary estimates of 1950 motor vehicle registrations, which indicate that by the end of the year at least 48,484,000 cars, truck and buses will be operating on the nation's highways. That would be an increase of 8.5 percent or 3,813,412 from the record-breaking number registered at the end of 1949.

Use of the underground mines of the Stewart Sand and Material Co.'s operations, Independence, Mo., as civilian defense bomb shelters in case of attack here is being contemplated by the local civilian defense organization.

WE HEAR

Home building dropped in October from the record levels of eight previous months, the Departments of Commerce and Labor have reported in their monthly joint report on construction activity. The drop in home building from September was 7 percent, but before that came a new record had been set when more than 1,100,000 new non-farm dwellings were started in the first nine months of 1950. Credit curbs had little effect on the downturn, government officials claimed. There was a sharp rise in construction of factories, stores and warehouses in October, however, partially offsetting the slump, in home building.

A cement mixer came to the aid of hundreds of hungry people who attended the annual flapjack day at Berthoud, Colo., recently. "Fabrication" of the hot cakes was on a production basis with the mixer being used to whip up the batter.

Contracts have recently been let for constructing a building at Cincinnati, Ohio, to house the research laboratories of the National Center for Water Pollution Research, U. S. Public Health Service. The project is expected to get underway in the near future.

Many quarry operators probably aren't aware that their deposit may contain some valuable stuff--uranium. Jesse C. Johnson, manager of the Atomic Energy Commission's raw materials operations, explained the possibilities at the Mining Congress in Salt Lake recently. Mr. Johnson feels that the prospector, like the infantryman, is not out-moded. Just to egg on the rock products industry, the A.E.C. is paying \$2.50 to \$3 per pound of uranium ore, depending on grade, delivered at a mill.

The cement shortage has prompted a London, England firm to advertise rapid delivery of portland cement, in the New York Herald Tribune.

American motorists consumed 36,835,254,000 gallons of motor fuel during 1949, the Bureau of Public Roads has reported. In nine of the 12 months, consumption exceeded 3 billion gallons monthly. Only 3,840,177,000 gallons were for non-highway use (agricultural, aviation, industrial and commercial, construction, marine and other miscellaneous purposes).

Extra manpower needs for defense and essential civilian output now figure out to about 3,000,000 men and women. Additions to the military services scheduled up to next June 30 will raise the total need to 4,100,000. A new government organization, Office of Defense Manpower, will soon release statistics to show the urgency of the situation. Skilled labor is getting scarcer and ODM expects the shortage to spread to semi-skilled workers by spring.

The expected ban on construction of new buildings for amusement, recreational or entertainment purposes was ordered by the National Production Authority. The ban (NPA M-1) went into effect on October 27. It is expected that other types of construction which do not further the defense effort will be placed under the ban also. These regulations do not apply to construction already started or to planned construction for which the total cost will not exceed \$5000.

An estimated 5000 new jobs will be created by the Government's decision to reopen all of the nation's facilities for producing synthetic rubber, some of which have been closed down since shortly after the end of World War II, according to an announcement by B. F. Goodrich Chemical Co. The program for producing 929,000 long tons of synthetic rubber of all types is scheduled to be accomplished early in 1951. B. F. Goodrich Chemical Co. has the responsibility of producing 150,000 long tons of the rubber.

THE EDITORS



AMERICAN EXPLOSIVES

used in extinguishing
underground
coal fire



When a vein of hard coal near Pottsville, Pennsylvania, became ignited, a nearby coal mine was threatened with destruction and the city of Pottsville itself became endangered.

AMERICAN Explosives' engineers were called in to direct operations. Through the skillful use of AMERICAN Explosives, approximately 6,500 square feet of overburden was removed from above the underlying seam. The burning coal was then scooped out and soaked with water.


AMERICAN Explosives' engineers have the experience and the know-how... and AMERICAN Explosives have "the stuff" to meet efficiently any field problem. AMERICAN Explosives are available in a complete range of strengths, velocities and densities. They are products of intensive research, quality control and modern manufacturing techniques—your assurance of maximum dependability, speed, and all-around economy.

Capable Field Engineers are Available at Your Call

★ High Explosives ★ Permissibles ★ Blasting Powder ★ Blasting Accessories




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THERMALLOY* FEED PIPE can really *TAKE IT!*

Thermalloy feed pipe assembly employing angled design for special installation.

Thermalloy "47" feed pipe and support pipe, 16" diameter.



Thermalloy 12' long kiln feed pipe.

***Stands up under abrasion, rough usage,
heavy loads, high temperatures***

If you're looking for longer service life from feed pipe and other kiln parts . . . investigate Thermalloy.

In scores of kiln installations, Thermalloy feed pipes have proved their ability to withstand elevated temperatures up to 2150°F without scaling or cracking.

Thermalloy feed pipes are available in a variety of designs—depending on method of support, relative position of hopper and kiln, design of kiln and size of pipe required. Let an Electro-Alloys engineer assist you in selecting the design and alloy best suited to your needs. Call your nearest Electro-Alloys office, or write Electro-Alloys Division, 2020 Taylor Street, Elyria, Ohio.

*Reg. U. S. Pat. Off.

Specify THERMALLOY* for heat and abrasion resistance
... CHEMALLOY* for corrosion resistance

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THE J. B. **EHR SAM** & SONS
MANUFACTURING COMPANY

National Gypsum Company
Buffalo, New York

We wish to congratulate you on the twenty-fifth anniversary of the founding of your company.

We furnished some of the equipment for your first plant in Clarence Center, New York, and have continued to furnish certain of your requirements for the past twenty-five years.

We are proud of our small part in helping you achieve high production of quality plaster, wallboard and lath.

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ESTABLISHED 1872 ENTERPRISE, KANSAS, U. S. A.



The 3' x 6' Model C,
Single Deck Screen

**The biggest
screen for the
smallest dollar**

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he Simplicity 3' x 6' Model C Single Deck Screen is without question the biggest screen value available on the market today, and it has always been the lowest priced screen of real capacity ever offered. The 3' x 6' screen *actually gives 3' x 6'*—18 square feet—of screening area with the famous Simplicity Gyrating Action. This Model C single deck screen is a standard unit *built for service in any industry*. Ideal for cleaning up a dirty stockpile or for making an extra size product outside your regular screening operations. The 3' x 6' Model C has all the work-proved Simplicity features, yet is a compact unit that can be installed in your aggregate operation at a saving you won't find elsewhere.

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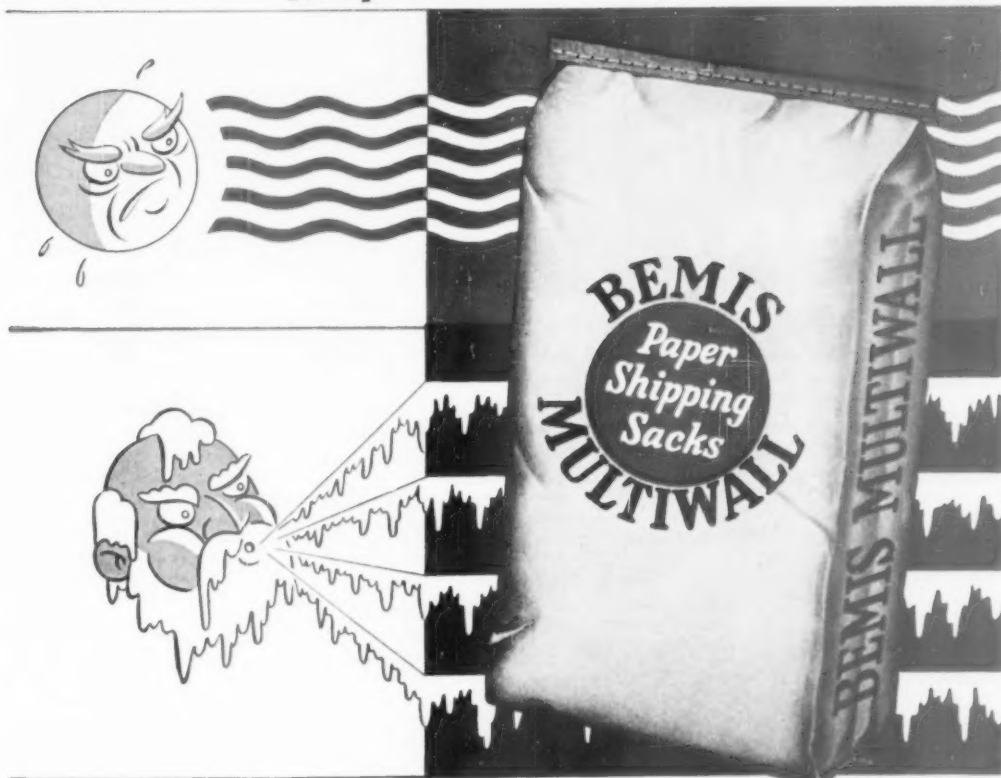
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Multiwall Paper Shipping Sacks are amazingly tough. They don't need to be pampered. But they *do* need reasonable care. Unless they're protected against moisture loss, they dry out and can't work their best when being packed, closed, or handled. In some sections of the country "drying out" may happen in winter, in other sections during the summer, depending on the humidity. But it's a simple matter to keep Multiwalls from getting thirsty. Bemis Multiwall Specialists show you how.

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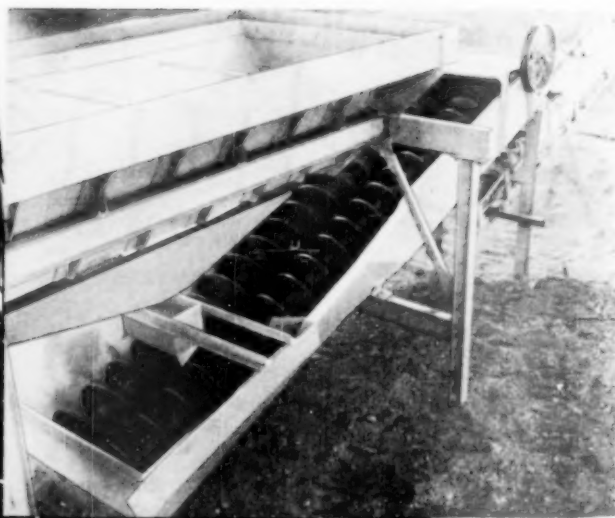
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QUIT WASHING SAND

DOWN THE DRAIN!



With the profitable combination shown above you can recover valuable, saleable sand that may now be going "down the drain." Dakota Sand & Gravel Co., Bismarck, N. D., uses an Eagle Water Scalping Tank to concentrate water borne sand and an Eagle Double Screw Long Weir Washer-Classifier-Dehydrator to wash, classify and dewater sand.

IT'S SIMPLE AS A B C

At Dakota, gravel is conveyed to an elevated wet screen. Material passing the bottom deck of the screen flows into an Eagle Water Scalping Tank. Solids quickly precipitate and flow to the Eagle Screw Washer below, through adjustable gates on the bottom of the tank. The dirty water flows over a weir to waste. Design of the scalping tank is based upon long experience and experimentation — one of those "things that couldn't be done." The water heavily charged with sand which is deposited in the screw unit, is quickly processed — the wash water flowing over the adjustable long weir at the lower end of the tub and the sand carried to the discharge at upper end of tub. The sand comes out clean and dewatered, and fed to conveyor belt stockpiler. Fines can be retained by raising weir on tub to increase head and reduce velocity — adjustable weir length flows off more or less fines. Many sand and gravel producers are now profiting from this combination.



Send for literature — Washer Cat. 47, Scalping Tank Bulletin 150.



Sand and Gravel Equipment

"SWINTEK" DREDGE LADDERS · SCREW WASHERS · LOG WASHERS · DEHYDRATORS · SAND TANKS · CLASSIFIERS

EAGLE IRON WORKS

137 Holcomb Ave.

Des Moines, Iowa

Investigate the Eagle "Swintek" Dredging Ladder — agitates bonded material, screens nozzle against boulders, carries oversize out of pumping zone. Catalog 745.



Editor's Page

An Outstanding Example of Free Enterprise in Operation

A MAJOR PORTION of this issue of ROCK PRODUCTS is in tribute to the National Gypsum Co. upon completion of its first twenty-five years in business.

Our decision to devote so much space to a single concern wasn't a hard one to make because the National Gypsum Co. is a standout representative among the gypsum, lime, crushed stone and rock wool industries. The company has been a pioneer and developer of so many practices that have been proved sound that we believe its policies and operating methods deserve careful consideration by other concerns in the industry that would grow and prosper.

Accomplishment of the National Gypsum Co. truly exemplifies the American system of free enterprise in operation. It proves what can be done to build a business that will continue to grow and provide more and more jobs, whatever the obstacles to expansion, if leadership is progressive and will take the initiative to adapt its actions to circumstances as they exist.

We have detailed the step-by-step development of the company in this issue, to point up the significant decisions and moves that were made in meeting changing economic situations over the years. We have gone further, in presenting the methods being followed in the conduct of all phases of the business, because, whether it be labor relations, safety, research, merchandising or plant operation, the company long ago established predetermined policies that have added up to success. There is much logic behind it all and each of the separate articles is written to bring out facts that will be helpful to readers in all branches of the rock products industries.

Labor-Management

There would not have been so much labor strife in industry during recent years if other concerns had given the recognition to changed conditions that National Gypsum Co. has. Its record with respect to labor relations is one of having never been accused of an unfair labor practice, and no major strikes at its twenty-three plants.

The company believes in labor's right to organize and to bargain collectively. Labor is kept informed of developments within the company, and management has taken a definite course of action to understand labor's problems in order better to provide for them. The worker is, above all, given recognition as an individual. Wages paid equal or exceed the standards for comparable work in the communities where plants are located

and a welfare plan, including pensions and comprehensive insurance, is in effect to provide a feeling of security among the workers.

Development of men, and loyalty to the men within the organization in making appointments to higher positions, are considered of the greatest importance to the success of the business and, because of this policy, the company is richly endowed with experts in top capacities and with others coming along, to guarantee top-flight management for the years ahead. Too often, companies have been short-sighted in that important respect with the result that they have found themselves short of trained men with the imagination to create products and processes, to envision new markets and new uses for existing products and to stimulate the creative powers of others.

Expansion

By keeping manned with key personnel of talent who know the business and who have been trained in accordance with predetermined and sound policies within the company, National Gypsum Co. has always been able to devise new products, to improve standard commodities constantly and develop and improvise better and cheaper ways of making them.

Diversification through research and the use of efficient mass production methods, developed through having personnel of imagination, have been and continue to be the answer to high wages and the inflationary spiral. On top of it has been the willingness to invest heavily in equipment and manufacturing facilities for constant expansion in order to drive costs down. It might be said that the philosophy of the company is one of creating opportunities for prosperity instead of waiting to capitalize on prosperous times that come along.

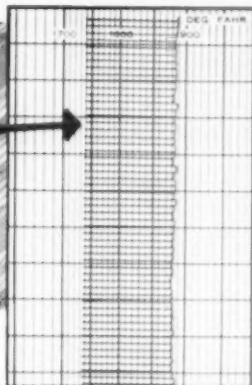
Through careful market analysis and recognition of the real extent of growth of the nation—many other industries are being criticized because they failed to evaluate demands—National Gypsum Co. equipped itself to greatly enlarge earnings in the postwar years in spite of the high cost of capital investment by increasing productive capacity one hundred percent. That investment is being protected by a greatly accelerated sales training program and by advertising now for times ahead when demand will again outstrip supply.

Bor Nordberg

ALL ROPES look ALIKE... but

IN

GRAIN SIZE OF STEEL IS ALWAYS UNIFORM



What has grain size of steel to do with longer rope life?

Plenty!

That's because in every commercial grade of wire rope, there's a certain critical grain size that gives highest resistance to bending fatigue. In Wickwire Rope we make sure that you get this definite grain size and that it is always uniform to exacting McQuaid-Ehn* standards.

Only a fully integrated company like Wickwire can give you this big advantage... because such control of grain size is possible only where all phases of manufacture are under constant check and test... starting with the melting and refining of the steel and continuing through heat treating processes and cold drawing of the wire.

Here again—Wickwire goes "beyond specifications" to give you assurance of wire rope that can't be beat for reliability, safety and longer life.

*For detailed information on the McQuaid-Ehn test, write to our Sales Office, at Palmer, Mass.

LOOK FOR THE YELLOW TRIANGLE ON THE REEL

Automatic heat control in our patenting or heat treating furnace operates within such close limits that the temperature in the furnace never varies more than a small fraction of one per cent.

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SUBSIDIARY

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PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corporation, Oakland 6, California

Rocky's NOTES

Nathan C. Rockwood

Little Used Tools for Concrete Research

FOR ABOUT 40 YEARS researchers into the mysteries of cement and concrete have occasionally brought forward the subject of colloidal reactions, but the great majority have consistently ignored the probable bearing of colloid science on the problems of concrete. Why this is so we do not know. We ourselves have been cautioned by experts to go slow on any such comments as these, presumably because the application of colloidal principles to the setting and hardening of cement and concrete is too complicated for such as us to comprehend. However, that is not our view, and we doubt if any one can have much understanding of concrete peculiarities unless he knows a little bit of the essential principles of colloid science, and we believe almost any one with a knowledge of elementary chemistry can readily acquire such an understanding.

Our own interest in the subject began in the early 1920's when we had an opportunity to read some of the accumulated literature on portland cement. Thus we discovered Dr. W. Michaelis' colloid theory for the hydration, setting and hardening of cement, first published in 1909. From then on we began to read such material on colloid chemistry as came our way, and to accumulate text-books on the subject. The first of these was "Applied Colloid Chemistry" by Dr. W. D. Bauer, 1921. We don't know whether this book is now in print or not, but so far as we know it is still the best elementary discussion of the subject with a minimum of the mathematical analyses involved.

Next we acquired a copy of Dr. Wolfgang Ostwald's "An Introduction to Theoretical and Applied Colloid Chemistry," 1922, translated by Dr. Martin H. Fischer.¹

This is most helpful because of the really entertaining way the subject is presented, easily understood by the ordinary reader. In the chapter on "Technical Applications" are a number of paragraphs on the setting and hardening of hydraulic cements. Dr. Ostwald wrote: "In the setting of mor-

tar or cement there must take place certain special changes besides the chemical [ones], which are responsible for the physical peculiarities resulting from these reactions. Recent investigations have proved the existence of such, and it has been found that we again deal with colloid-chemical processes." Dr. Ostwald is still quoted in the most recent works on colloid chemistry as an outstanding authority on many fundamentals of the science.

About this time (1922) the American Chemical Society established a colloid chemistry division, with annual symposiums. One published in 1928, "Colloid Symposium Monograph," edited by Dr. H. B. Weiser,² attracted our attention because it contained one paper specifically on hydrated portland cement treated as a colloid, by Dr. Alfred H. White, which has been extensively referred to in more recent literature, without however stating the fundamental fact established by Dr. White that hydrated cement is, to all practical purposes, primarily a colloidal material.

When we turn to the literature on the chemistry of portland cement, such as Lea and Desch, "The Chemistry of Cement and Concrete," 1935,³ we find several pages on the colloidal properties of hydrated portland cement, but there is no discussion of how these properties may be utilized to the best advantage, either in the study of cements and concrete or in their application to concrete mixes. Aggregates, too, have colloidal properties, in that they have surface reactions, or energies, as has been proved in the case of the alkali reactive cements and siliceous aggregates. We understand that Lea and Desch are presently engaged in revising their book, and it is to be hoped they will expand their treatment on the colloidal phases of cement, aggregates and concrete.

Dr. R. H. Bogue, in his "The Chemistry of Portland Cement" discusses briefly the "colloid hypothesis" of Michaelis and the crystallization theory of Le Chatelier, and many later

observations of other researchers, apparently accepting none of them without some qualifications. Although Dr. Bogue was a well-known authority on colloid chemistry before he took charge of the research work on portland cement at the National Bureau of Standards under the sponsorship of the Portland Cement Association, he does not stress the significance of the colloid properties of cement and concrete as one would expect under the circumstances.

We have before us now two very recent books which will prove helpful to those who already have some understanding of colloid chemistry. One is "Colloid Science" by Dr. James W. McBain,⁴ which is described by its author as "a new systematic approach to fundamentals covering main concepts and present trends." It will be found rather technical for the uninitiated reader, for many terms are not defined. Otherwise it is all that the description above says. Colloid science covers a very broad field, with many applications in which our readers would not be particularly interested, but there are chapters in this book that should be of very direct value to any one interested in cement and concrete. These are the numerous references to the colloids of silica, alumina and iron oxide, and the quite comprehensive discussion of clays. There are no references whatsoever to cement, mortar or concrete, which seems to us is an indictment of the researchers in this field that they have not made more contributions to "colloid science."

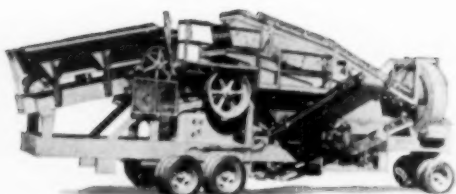
This book will make clear many easily understood properties of colloids, such as sorption, viscosity, thixotropy, plasticity and dilatancy, coagulation, protective action, sensitization, diffusion, etc. While specific examples in cement are not given, it does not require very much imagination on the part of a cement or concrete expert to see many applications to his products. There are numerous references to silica, and it is generally recognized that colloidal silica and silicates are primarily responsible for the useful properties of portland cement.

Another new book is "Surface Chemistry," being a collection of papers presented at a joint meeting of the Société de Chimie Physique and the Faraday Society, held in France in October, 1947. This, of course, comprises the work of some of the world's greatest authorities on colloid science. It is printed in French and English. We must confess that this book is hard reading for a layman, and is concerned largely with the surface or physical chemistry in processes which are unrelated to cement and concrete. Nevertheless, the real student of colloid science will find it suggestive.

¹McGraw-Hill Book Co., New York, N. Y.
²John Wiley & Sons, Inc., New York, N. Y.

³The Chemical Catalog Co., Inc., New York, N. Y.
⁴Longmans, Green & Co., New York, N. Y.

¹Reinhold Publishing Corp., 316 West 42nd St., New York, N. Y., 1947.
²Reinhold Publishing Corp., New York, N. Y., 1928, price \$9.00.
³Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y., 1949, price \$5.25.



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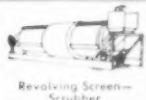
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LABOR RELATIONS TRENDS

Extending the Application of N.L.R.A.

By NATHAN C. ROCKWOOD

SOME OF THE DOUBT of producers and manufacturers in local industries, as to whether or not they are subject to the National Labor Relations Act, and the Labor-Management Relations Act of 1947, has been cleared by two recent decisions of the National Labor Relations Board. Both involved construction material producers, who hitherto had considerable reason to believe themselves outside the interstate commerce definitions of the Act.

The first of these, which presumably has set the pattern for similar cases, involved a dispute between an A. F. of L. sawmill workers union and a California lumber company over the election of a collective bargaining representative. The question to be decided was whether this operation sufficiently "affected" interstate commerce to give the National Labor Relations Board jurisdiction.

The facts, in the main, were these: The lumber company purchases of timber, logs, supplies and equipment during the fiscal year amounted to more than \$112,000. Of these purchases some 6 percent (\$6720) was shipped directly to the purchaser from outside the state. Another 7 percent (\$7840) originated outside the state but was purchased from suppliers in the state. The company's sales were all made within the state of California, amounting to \$686,000. No shipments of these materials were made outside the state.

However, one of the customers alone took about \$450,000 worth of the lumber company's products, and this customer was engaged in interstate commerce, both directly in processing and reselling some of the lumber and in supplying material for a Masonite plant which was in interstate commerce. Thus, while the original producer was not in any sense directly in interstate commerce with its own output, the Board held that its business so "affected" interstate commerce as to bring it under the Board's jurisdiction. The case is obviously very similar to that of many local producers of sand, gravel, crushed stone, ready-mixed concrete and concrete products, who hitherto have considered themselves outside the law.

Stretches Interpretation

The text of the Board's decision reads in part as follows: "The employer contends that it would not effectuate the purposes of the Act for the Board to exercise jurisdiction over its operations. We do not agree. The Board has long been of the opinion that it would better effectuate the purposes of the Act, and promote the prompt handling of major cases, not

to exercise its jurisdiction to the fullest extent possible under the authority delegated to it by Congress, but to limit that exercise to enterprises whose operations have, or at which labor disputes would have, a pronounced impact upon the flow of interstate commerce. This policy should, in our opinion, be maintained. The time has come, we believe, when experience warrants the establishment and announcement of certain standards which will better clarify and define where the difficult line can best be drawn.

"The Board has determined that it will exercise jurisdiction over those enterprises which affect commerce by virtue of the fact that they furnish goods or services necessary to the operations of other employers engaged in commerce, without regard to other factors, where such goods or services are valued at \$50,000 per annum or more, and are sold to: (a) public utilities or transit systems; (b) companies which function as instrumentalities and channels of interstate and foreign commerce and their essential links; or (c) enterprises engaged in producing or handling goods destined for out-of-state shipment, or performing services outside the state in the value of \$25,000 per annum or more. This standard reflects, in large measure, the results reached in the Board's past decisions disposing of similar jurisdictional disputes."

This decision evidently is a direct result of the decision of the Circuit Court of Appeals, District of Columbia, in the Denver, Colo., building trades case, reported in our November issue. In so many words it means that any local business concern which produces and sells any of its products to another concern, which uses this product in its own interstate business, to the extent of \$25,000 worth a year, is now subject to the jurisdiction of the N.L.R.B. in case the employer becomes involved in any kind of a labor dispute. It will be compelled to bargain collectively with its employees, provided its annual production is valued at \$50,000 or more, regardless of its local nature.

Concrete Products Case

We did not have to wait long for an example that strikes home to many readers of this page. It involved a Tampa, Fla., concrete products and ready-mixed concrete operation. The employer discharged a truck driver for the asserted reason that he disobeyed the instructions not to permit his truck engine to run when he was otherwise engaged, and for not check-

ing his gasoline supply before beginning his day's work. Obviously, to us and to the industry in general, these appear to be common ordinary precautions necessary in the interests of safe operation of trucks on the public streets and highways.

The union, however, contended that he was fired because of his union activities, and therefore took their complaint to the N.L.R.B., under their interpretation of the law. The employer naturally contended that its business was entirely local, and that the Board had no jurisdiction. The Board ruled otherwise "in accordance with the announced policy" in the lumber company case, quoted in the preceding paragraphs. The Board said that this local concrete products producer in the last 17 months had sold products and materials (including sand and stone) in excess of \$3,000,000, of which some 5 percent (\$150,000) was sold to contractors and industrial concerns "engaged in interstate commerce or in activities affecting interstate commerce. These contractors and industrial concerns include some enterprises over which the Board has already asserted its jurisdiction."

Hence, having established its claim to interfere, the Board went ahead to find the union's contention proved. The decision says the employer did not discharge the truck driver for cause, but merely used this as a pretext for getting rid of him as a union agitator. The Board admitted that the driver did stop at a roadside stand for a "soft drink," leaving his truck engine running, and he had been negligent in not checking his gasoline supply. The reason why the employer's alleged reason for discharge was not sound, the Board held, was because no other driver had ever been discharged for these reasons under "similar circumstances." In fact this same driver had on two previous occasions run out of gas "without receiving any criticism from his superiors"—and there was no damage to the truck on either occasion.

Moreover, the Board said, this driver had been considered competent, and his discharge came without previous warning. But, said the Board, this employee had been instrumental in establishing the union in this operation; the employer knew of his union activities, and the employer's division superintendent was alleged to have threatened to discharge this employee if "he could get anything on him." The superintendent even admitted after the firing, according to the Board, that "he had been after the employee a long time and finally got him."

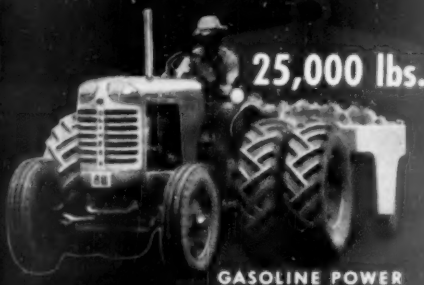
So, the Board ordered this employer to cease and desist from trying to discourage union membership, or in any manner interfering with employees' self-organizational rights. Also, the employer must offer to take back the discharged employee and reimburse him for his lost pay.

(Continued on page 150)

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the *Personal Side* of the news

Sales Manager

HENRY W. GRUPNER, general sales manager for Marquette Cement Manufacturing Co., Chicago, Ill., for the past seven years, has been appointed sales manager for the Mississippi-



Henry W. Grupner

Southeastern Arkansas-Louisiana area to be served by the new plant now under construction at Brandon, Miss. He will head the sales office to be opened in Jackson early in 1951. Born in Little Rock, Ark., Mr. Grupner joined the Marquette staff 26 years ago as Arkansas sales representative. Two years later he was promoted to special representative for the entire Southern division. In 1933 he was appointed sales manager in Memphis, Tenn., and ten years later became general sales manager in the Chicago office.

Addresses Conference

JOHN P. SANGER, vice-president of the U. S. Gypsum Co., Chicago, Ill., addressed the sixth annual National Conference on Industrial Hydraulics at a recent meeting in Chicago, Ill. Mr. Sanger is a member of the Hoover Commission.

Assistant to President

ROBERT J. UNGER has been appointed assistant to James H. Ackerman, president of the Lawrence Portland Cement Co., New York, N. Y. He was formerly assistant purchasing agent. Mr. Unger joined the company in 1935 as a member of the sales department, and from 1938 to 1942 was sales representative in Connecticut. The next three and a half years he spent in the

Army, serving part of the time in the European theater. Upon his return he rejoined Lawrence as a member of the purchasing department and subsequently became assistant purchasing agent.

On Research Staff

ERWIN C. HOEMAN, formerly on the technical staff of Battelle Memorial Institute, has been appointed research chemist at the general research laboratory recently established at the Des Moines, Iowa, plant of Marquette Cement Manufacturing Co., Chicago, Ill. The new laboratory will augment the work of the Portland Cement Association laboratories at Skokie, Ill., and those located at all Marquette plants. C. E. Wuerpel, technical director of the P.C.A., has been named general supervisor, and Charles U. Pierson, Jr., formerly with the Portland Cement Association, has been placed in local charge of the laboratory as chief research assistant to Mr.



Erwin C. Hoeman

Wuerpel. William E. Woody, graduate chemical engineer from Iowa State College, has been named assistant research chemist.

Profile of Cement Executive

CIRI DOBBINS, one-time office boy who today at the age of 46 is executive vice-president and general manager of Ideal Cement Co., Denver, Colo., is a man of quiet ways and gracious manners and an immense capacity for work. His early life was the life of an average boy. After graduating from high school, he attended night classes at the University of Denver, and received his degree in business in 1927, eight years

after he joined Ideal. Starting as office boy, he has successively been assistant sales manager, sales manager, assistant to the president, vice-president and general manager, and now executive vice-president and general manager. The story most frequently



Ciri Dobbins

told about Mr. Dobbins' early days at Ideal goes back to the time when he was an office boy and was asked what he would most like to be. Without hesitation, he replied, "Why, president of this company, of course." Looking back over the years, Mr. Dobbins acknowledges that the late Charles Roettcher was probably the most important single influence upon his professional life and character. "He was a man of amazing energy," said Mr. Dobbins. "And he was a great believer in men. Mr. Roettcher had the confidence and affection of every man who worked for him. He was a rare personality." Mr. Dobbins has inherited Mr. Roettcher's belief in men, the power to instill confidence, and the faculty of cutting through a mountain of work with seeming ease. Business to him is an adventure. He believes the opportunity for youth is greater than ever, that the challenge has never been so clear, and that this is an age of adventure.

Mr. Dobbins also is a director of the Portland Cement Association, the American Crystal Sugar Co., the Denver National Bank, director-trustee of the Portland, Colo., Hospital Association; a trustee of the University of Denver; an executive committee member of the Denver Chamber of Commerce, and is on the executive boards of the Boy Scouts and Y.M.C.A.

The Man Who Made National Gypsum National

THE SUCCESS of Melvin H. Baker, president of the National Gypsum Co., is an excellent example of how far a good salesman, with executive ability, can go in American industry in a few short years. The common garden variety of salesman is as "numerous as the leaves on the trees"; and apparently it requires no great ability to sell something material, that some one else needs or thinks he needs. The real test of salesmanship is to sell the intangible, and have satisfied customers. That, to our mind, was the most striking accomplishment in the life of Melvin Baker.

We have here the typical American boy, with a background of several generations of American ancestors, Scotch-Irish in origin, born in the Tennessee hill country in 1886. This section of the U. S. has often been described as the last stand of simon-pure Americanism, and we are glad that "the hero" of this narrative was such a typical American. His schooling by his own efforts was rather more than customary with his local contemporaries. He went through local grade and high schools and two years in a little Baptist college, by liberal use of his own "shank's mare," and various jobs to earn his keep. His ambition was to study engineering, but his college was designed to educate for the ministry!

Mel Baker's first sales job was as assistant to an auctioneer in the sale of a warehouse full of hardware items that were not moving fast enough. With that experience he was able to land a job as a distributor for a Wisconsin window screen manufacturer for a new territory in four South-eastern States. It was here that he began to establish the reputation for industry and honest dealings, which must always be the foundation of any lasting business success. Through his contacts in this building materials field, he met a representative of the old Beaver Products Co., makers of "Beaverboard." Through this acquaintance he met J. F. Haggerty, vice-president of the Beaver Products Co., and joined the organization as a Southern States sales representative.

After three years of this, he sought and obtained from Joe Haggerty the job of general sales manager of the company. The War, 1917-18, greatly spurred the demand for wallboard because of the construction of so many temporary barracks, and the company was doing fine until the postwar slump of 1922, when it was caught with so much in short-term loans to banks, that the banks closed it out. That left three men without jobs, Mel Baker, J. F. Haggerty and C. E. Williams, the geological expert and mining engineer of the company.

Having experienced the failure of a prosperous, going concern as a result of short-term financing, it is typical of Mel Baker, with his ever enquiring mind, to seek expert information on the mysteries of finance, just as he had always sought and obtained an expert knowledge of the products he had to sell. We like to think this was a result of his engineering or analytical type of mind, although he never could be called an



Melvin H. Baker

engineer. So, within two years he became vice-president of the American Manufacturers' Foreign Credit Underwriters in New York City.

The meeting of Haggerty, Baker and Williams in Buffalo in 1925 is said to have been by chance, and only to celebrate old times and old friendships. But, when ambitious men get together, each an expert in his line, and each experienced in one building materials line, it was inevitable that the idea occurred, and was pursued, of starting the manufacture of gypsum wallboard and other gypsum products. Mr. Haggerty was able to supply the inspiration and the imagination required for large scale promotion. Our own recollection of him is that to one unfamiliar with his accomplishments, he might have passed for a poet. Mr. Baker, as we have seen, was the super-salesman, and Mr. Williams had acquired options on some gypsum deposits.

Here is where the test of super-salesmanship came in, for the enterprise, existing only in the imagination of these three men, needed \$2,000,000 of initial capital. And this was a time, 1925-26, when people with capital were "making money" so fast in the stock market, swapping securities in going concerns, that few could be found to have the patience and foresight to invest in something yet to materialize! Mel Baker, the irresistible salesman, and Buffalo, a city

of wealth and civic pride, did supply most of the capital and production started at Clarence Center. The growth of the company under Mel Baker, for he had to take over sole responsibility in 1929, upon the death of Mr. Haggerty, is detailed elsewhere in this issue. So, we may end this brief sketch of the salesman "who went to town," and he has never so outlived the principles on which he founded his career as ever to fail in continuing to sell himself, his company and its products, to his associates, employees, capitalists, customers and the public. In numerous instances, they are one and the same, which speaks mighty well for any organization.

Foreign Guests

HARRY H. BRANDON, president of the Clinton Construction Co., Wilmington, Ohio, played host recently to ten students from other countries who are attending Wilmington College, taking them on a tour of the operations of the Clinton Construction Co. and the Melvin Stone Co. He discussed the operations of the various plants to be visited by the students and explained the operation of the ready-mixed concrete and concrete block plants. He also told how limestone is obtained at Melvin, crushed into sizes and washed. The students were taken to the concrete plant south of Wilmington, the Melvin Stone Co. plant at Melvin, and also the Clinton Construction Co. asphaltic concrete mixing plant. Students who were guests of Mr. Brandon were Misses Ming Wong, Hong Kong, China; Jessmin Szeto, China; Ruth Lederman, Israel; and Lillian Chow, Hawaii; Wakatsu Oshiro and Tsuyoshi Oshiro, Okinawa; Eric Manniche, Denmark; Sven Heikka, Sweden; Adib Tabri, Jordan; and Glenville Watson, Jamaica.

Traffic Club Officers

RUSSELL W. HUNT, president and general manager of the Southwest Lime Co., Neosho, Mo., is first vice-president of the Tri-State Traffic Club, Pittsburg, Kansas, and Earl C. Toutz, vice-president and sales and traffic manager of the Independent Gravel Co., Joplin, Mo., is secretary-treasurer of the Club. Both Mr. Hunt and Mr. Toutz attended the recent fall meeting of the Club in Pittsburg, Kansas, which was followed by a golf tournament at the Elks Country Club and a dinner at the Besse Hotel.

Plant Managers

ROY L. SLOCOM, plant manager of the Universal, Penn., plant of the Universal Atlas Cement Co., New York, N. Y., has retired after more than 45 years of service with the corporation. Emmert F. Harchelroad, assistant plant manager, succeeds Mr. Slocom as plant manager, and Rich-

and M. Kelley, general operating foreman, has been appointed assistant plant manager.

Mr. Slocum was first employed as millwright and machinist at the Homestead Works of Carnegie-Illinois Steel Corp. in 1905. He joined the cement company in 1907 as construction foreman when the Universal cement plant was being built, and in 1910 became assistant superintendent. In 1930 he was appointed plant manager.

Mr. Harchelroad joined Universal-Atlas in 1915 as a messenger at the Universal plant. In 1924 he became construction engineer, and in 1942 was appointed assistant plant manager.

Mr. Kelley became associated with the cement company in 1947 as a practice engineer at the Universal plant, and one year later was appointed general operating foreman.

Assistant Manager

ELMER S. CRIFE, sales representative in the Rockford, Ill., area of The Celotex Corp., Chicago, Ill., has been appointed assistant manager of the Chicago sales branch. He succeeds J. E. Varhe who has been made manager of the branch.

Joins P.C.A.

HELEN E. McMILLEN has been appointed a member of the analytical laboratory staff of the Portland Cement Association in Skokie, Ill. She was formerly a chemist with the research division of the Standard Oil Development Co.

Forms Partnership

NEIL LIDSTONE, superintendent of the new concrete products plant of The Carter-Waters Corp., Kansas City, Mo., has resigned to form a partnership with Don Strude, a former schoolmate and a department head of the Southwestern Bell Telephone Co., in the Diamond Block Co., Las Cruces, N. M. Succeeding Mr. Lidstone as superintendent is Jesse Searcy, who started in the Haydite business 26 years ago with the original inventor of Haydite, Steven J. Hayde. He worked under the second and third owners, R. W. Eliau and Dan Servey, and continued as superintendent of operations after Carter-Waters took over the business.

Association President

GEORGE D. SIBLOW, a vice-president of the American Rock Wool Corp., Wabash, Ind., has been elected president of the National Mineral Wool Association, New York, N. Y., to succeed William R. Wilkinson, vice-president of Johns-Manville Sales Corp. C. J. Rusden, president of Feltrok Insulation Manufacturing Co., Tacoma, Wash., has been named vice-president.

Vice-President of Sales

R. H. B. SMITH, who since 1943 has been sales manager for Dragon brand cements in the New England divisions of the Lawrence Portland Cement Co., New York, N. Y., has been elected vice-president in charge of sales. He will make his headquarters in the



R. H. B. Smith

New York office, and will have direct supervision of all sales, with jurisdiction over the district offices maintained in Thomaston, Me., Boston, New York City, New Jersey and Philadelphia. Mr. Smith was formerly associated with the Universal Atlas Cement Co.

changed to The Valve Bag Co. of America, and Mr. Urschel was a member of the board and active in its management until the company was purchased by the St. Regis Paper Co. For many years, Mr. Urschel was an active member of the board of the National Lime Association and, in 1926, was one of the charter members of the Finishing Lime Association of Ohio. He is survived by his son, George C. Urschel, manager of the company, and two daughters, Mrs. Edward Gillette of Toledo and Mrs. Howard Rex of Pearlbeach, Mich., nine grandchildren and five great-grandchildren.

WILLIAM JAMES TIMBERMAN, founder of the Long Island Sand and Gravel Co., now the Gallagher Sand and Gravel Co., Long Island, N. Y., died recently at his home in Ridgewood, N. J. He was 84 years old. After attending public schools in Jersey City and old Trinity School in lower Manhattan, Mr. Timberman, in 1890, organized the Lighter Transportation Co., which transacted a general lighterage business in New York harbor for railroads and steamship companies. Seven years later he formed the Long Island Sand and Gravel Co. In 1901, the company was merged with the Goodwin Brothers Co., under the latter name, and Mr. Timberman became vice-president and general manager. In 1912 Goodwin Brothers was sold to the Gallagher Sand and Gravel Co., and Mr. Timberman retired from active business, but only temporarily. Early in 1917 he assumed direction of the Nassau Sand and Gravel Co., and continued in that position until his final retirement in 1938. Mr. Timberman was considered an authority on sand quality control, production and transportation. In the course of his career he operated Long Island sand properties at Sands Point, Hempstead Harbor, Oyster Bay, Cold Spring Harbor, Faton's Neck and Port Jefferson.

FRANK G. VAN HORN, owner and operator of the F. G. Van Horn Cement Block Co., Pontiac, Mich., which he founded 34 years ago, passed away recently. He was 68 years old.

DEE G. WHEELER, manager of the Celotex department of The Celotex Corp., Chicago, Ill., passed away October 21. He was 62 years old and had been associated with the company since 1938.

FLOYD HAROLD POTTER, president of the Newaygo Gravel Co., Newaygo, Mich., died October 19 at the Michigan Veterans Hospital at Grand Rapids. He was 28 years old and had served as a sergeant with the 193rd tank battalion in World War II.

ROY R. WILSON, owner of the Decatur Hydraulic Sand and Gravel Co., Decatur, Ill., died October 4 at the age of 73.

OBITUARIES

JOHN JACOB URSCHEL, chairman of the board of The Woodville Lime Products Co., Woodville, Ohio, died October 27 after a long illness. He was 77 years old. Born on his father's farm in Monclova, Lucas County, Ohio, Mr. Urschel started his career in the lime industry as a salesman for his uncle, producer of quicklime at Sugar Ridge, Ohio. In 1901, Mr. Urschel purchased the lime plant known as the Rancamp plant, in Woodville, Ohio, and organized The Woodville Lime Products Co., which early began the development of hydrated lime and was one of the pioneer producers of this product. Early in his career, Mr. Urschel recognized the superior qualities of the dolomitic lime he produced and was one of the first to develop the present-day finishing hydrated lime. He subsequently organized the Urschel-Bates Bag Co., which had a license to furnish all of the lime bags to the lime industry. The valve bag packer was developed at his plant. Later, the name was

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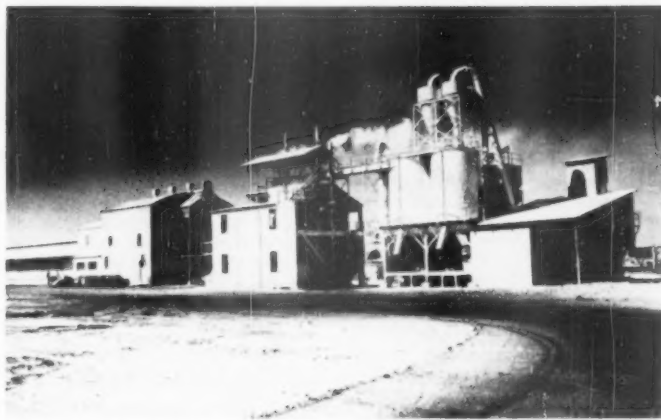
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INDUSTRY

News



Plant of Union Gypsum Co., Phoenix, Ariz., recently sold to Certain-teed Products Corp., Ardmore, Penn.

Sells Gypsum Plant

UNION GYPSUM CO., Phoenix, Ariz., has sold its Arizona plant to the Certain-teed Products Corp., Ardmore, Penn., a large producer of gypsum building materials and related construction items. Key operating and sales personnel will remain as members of the new management. The Certain-teed corporation has already made plans for an expansion program which will include the building of a gypsum wallboard and lath plant and the enlargement of present plant facilities.

Lime Conference

THE ANNUAL OHIO LIME AND Fertilizer Conference was held December 1, 1950, in the State Office Building, Columbus, Ohio. Among the subjects discussed were practices that are important in maintaining the productivity of the land and which increase the returns secured from good lime and fertilizer programs, drainage and erosion control. Also, there was a statement of the returns secured in Ohio from the use of liming materials and fertilizers.

Authorize \$500,000,000 Highway Program

THE NEW FEDERAL AID ACT has authorized expenditures of \$500,000,000 for the fiscal year 1952-53 for highway construction. The legislation represents an increase of \$50,000,000 annually from the current rate of federal aid and makes available an addi-

tional \$100,000,000 in the two years, which, when matched by the states, will make possible a \$200,000,000 expansion of the record-breaking post-war highway program. Of the total appropriation, \$225,000,000 will go for federal-aid primary roads, \$150,000,000 for secondary roads, and \$125,000,000 for the federal-aid urban system.

Other miscellaneous authorizations include \$37,500,000 for forest highways, roads and trails, \$23,000,000 for national parkways, roads and trails and \$6,000,000 for Indian reservation roads, according to the National Crushed Stone Association.

Agstone Group Prepares Booklet for Dealers

A DESCRIPTIVE AND ILLUSTRATED FOLDER for dealers of agricultural limestone, reminding them of sales promotion to farm customers has been prepared and issued by the National Agricultural Limestone Association. The folder, entitled "Hello Folks," is designed as a direct mail promotion piece and is complete with the name of the dealer printed on it.

Opens Limestone Quarry

EVANS STONE CO., Pineville, Ky., recently began operations at its new limestone quarry. Equipment has been installed at the plant to produce crushed limestone for roads, buildings and general construction. The company will also produce agricultural limestone.

Minnesota Aggregate Firm Starts Texas Operation

DEUTZ AND CROW SAND AND GRAVEL CO., Marshall, Minn., has recently expanded its operations to include establishment of a new plant in Snyder, Texas. Name of the new plant is the Cactus Sand & Gravel Co., and its incorporators are E. J. Crow, Hubert Deutz, and G. A. Olsen of Minnesota and W. W. Porter of Texas. The operations are set up about 14 miles from Snyder, near the Colorado river where there are large gravel deposits.

Two Caterpillar D7W10 rubber-tired tractors and wagons, a Bucyrus-Erie 15B dragline with a Hendrix 5-cu. yd. bucket and a Pioneer 305W washing plant are included in the equipment at the new plant. Pioneer built a special 10-cu. yd. hopper to accommodate the 10-cu. yd. loads carried by the D7W10's.

The plant is hauling equal amounts of gravel weekly from each of six different leases, taking the gravel from sand bars along the Colorado river. When the river seasonally rises to cover the sand bars, gravel is taken from a range of small hills about 150 ft. from the stream.

Increased Use of Lightweight Aggregates

RECENTLY TWO MAJOR buildings were erected in Los Angeles, in each of which there was a structural steel saving of a thousand tons or more effected by the use of lightweight concrete aggregates, according to the Great Lakes Carbon Corp., New York, manufacturer of Permalite lightweight aggregate. A company spokesman said that lightweight Permalite concrete used as a floor fill and as a roof deck will effect a steel saving of important proportions, and that a deadweight saving of 200 lb. per lineal ft. is effected by the use of lightweight aggregate plaster protection.

Short Course for Salesmen

NATIONAL CRUSHED STONE ASSOCIATION has announced that the fourth short course for crushed stone salesmen will be held January 3-5, 1951, at the U. S. Chamber of Commerce building, Washington, D. C. The program is being designed to cover as many as possible of the subjects requested by member companies, and the speakers chosen for the lectures are all experts in their special fields.

Portland Cement Production

THE PORTLAND CEMENT industry produced 20,945,000 bbl. of finished cement in September, 1950, as reported to the Bureau of Mines. This was an increase of 9 percent compared with the output in September, 1949. Mill shipments totaled 22,910,000 bbl., an increase of 1 percent over the September, 1949 figure, while stocks were 29 percent below the total for the same month in 1949. Clinker production during September, 1950, amounted to 20,392,000 bbl., an increase of 13 percent compared with the corresponding month of the previous year. The output of 20,945,000 bbl. of finished cement during September, 1950, came from 150 plants located in 36 states and Puerto Rico. During the same month of the previous year 19,181,000 bbl. were produced in 146 plants.

Panamanian Cement

THE REPUBLIC OF PANAMA, until a few years ago, had been a large importer of cement, but Panama is now exporting cement in large quantities to nearby countries, as well as fully supplying its local market. This is the result of the establishment of the Compania Cemento Panama, S. A. This company was organized in 1943, but it was not until 1948 that it began to produce enough cement to become an exporter. Its capacity is now 200 tons daily. Cemento Panama has furnished much of the cement for the Panama Canal project and also exports cement to Colombia, Venezuela, Costa Rica and Ecuador.

Vermiculite Impact Test

VERMICULITE INSTITUTE, Chicago, Ill., has announced that the vermiculite plaster solid partition impact test, as performed by the Detroit Building Trades School, Detroit, Mich., surpassed that of the sand plaster test. Two partitions, one of vermiculite plaster on gypsum lath, and the other of sand plaster, each of identical conventional construction, rigidly braced, were tested in accordance with a standard test procedure and acceptance conditions. The vermiculite partition showed greater temporary deflection than the sand partition, but was better able to regain its initial position, according to the institute report.

Non-Toxic Fungicide

SCIENTIFIC OIL COMPOUNDING CO., Chicago, Ill., has a line of industrial fungicide products adaptable to maintenance uses in prolonging the life of various materials used throughout plant operations. These products, called Cunilates, are non-toxic mildew

preventives. Through a special process of solubilization, the properties of copper-8-quinolinate as a fungicide are enhanced and rendered highly effective as a permanent non-toxic mildew preventive for the protection of rope, burlap and other fabrics, wood, leather, protective and insulating coatings and other susceptible materials against the ravages of destructive organisms. These Cunilates are available for either solvent or emulsion treatment.

One of the Cunilates is extremely effective in the preservation of rope and cordage, incorporating itself directly into the cordage oil and thus treating the rope fibers instead of merely the finished rope. The tensile strength of manila rope is enhanced by an emulsion of a Cunilate, according to tests conducted by a government agency. Cotton rope, in the manufacture of which no cordage oil is used, can be rendered exceedingly water-repellent after treatment with a Cunilate. Burlap is being treated with Cunilate formulations as a preservative of burlap bags.

It may be that Cunilates can be used effectively for treatment of paper bags, paper for wallboard, paper for rock wool batts and possibly for protective coating of rock wool fibers through application in the blowing process. They have other potential uses in the treatment of tarpaulins, burlap or canvas used in the curing of concrete products, for belting and for other materials used in industry. A complete line of Cunilates is available to meet the specific requirements of each fungiciding problem.

Mexican Cement Exports Put Under Control

CEMENT EXPORTS FROM MEXICO have been placed under government control, with all future shipments being authorized by the Ministry of National Economy under the terms of a new government decree. The purpose of the controls is to prevent a domestic shortage with consequent speculation and black marketing. Mexico now produces over 1,000,000 metric tons of cement annually.

The Mexican government also granted importers of bags for cement a subsidy to lower the cost of the bags, due to protests from cement producers claiming that under the Mexican system of determining import duties by weight, the cost of such bags was so high that it would force a rise in cement prices. The subsidy will remain in effect until early next year when two factories for producing cement bags will start operating in Guadalajara and Monterrey.

Cement Inspection Tour

MEMBERS OF THE NORTH CAROLINA CEMENT COMMISSION, headed by E. R. Hanford, made a 10-day inspection tour visiting cement plants in South Carolina, Georgia, Alabama and Tennessee, for the purpose of determining whether or not it would be wise for the state of North Carolina to build and operate its own cement plant. The commission will make a report of its findings to Governor W. Kerr Scott and will include recommendations on what should be done.

Coming Conventions

January 16-18, 1951—

National Agricultural Limestone Association, 6th Annual Convention, Hotel Statler, Washington, D. C.

January 22-25, 1951—

National Concrete Masonry Association, Annual Meeting and Concrete Industries Exposition, Cleveland Auditorium, Cleveland, Ohio.

February 5-9, 1951—

National Crushed Stone Association, 34th Annual Convention, and Agricultural Limestone Institute, 6th Annual Convention, Netherland Plaza Hotel, Cincinnati, Ohio.

February 11-15, 1951—

National Sand & Gravel Association, 35th Annual Convention, and National Ready Mixed Concrete Association, 21st Annual Convention, Roosevelt Hotel, New Orleans, La.

March 1-3, 1951—

American Concrete Pipe Association, Annual Convention, Waldorf-Astoria Hotel, New York, N. Y.

March 12-14, 1951—

American Road Builders' Association, 48th annual meeting, Schroeder Hotel, Milwaukee, Wis.

Lone Star's New Plant Near Sweetwater, Texas

CONSTRUCTION HAS STARTED on the new plant of the Lone Star Cement Corp. near Sweetwater, Texas, in the heart of the rapidly developing West Texas area. The plant is situated near Maryneal on the Santa Fe railroad. With an annual productive capacity of between 5,000,000 and 6,000,000 sacks, this new mill, the third Lone Star plant in Texas, will be one of the most modern in the world.

With materials and machinery already on order, construction schedules call for completion sometime during 1951, with every effort being made to start cement shipments at the earliest practicable date. All of the work will be done by Walsh Construction Co. and Gifford-Hill & Co., Inc., who are associated as general contractors.

Adjacent to the mill where the limestone quarries are located, a large crushing plant will be constructed. The crusher will take the largest pieces of limestone rock that can be handled by electric shovels with 3-cu. yd. dippers and reduce them to six to eight in. size. Secondary crushers will reduce material to minus 1/2-in. size. The quarry and crushing plant will have a capacity of about 500 t.p.h.

The storage building and adjoining mill will be a very imposing structure. Constructed entirely of concrete, the roof will consist of an arch with a 77 ft. clear span.

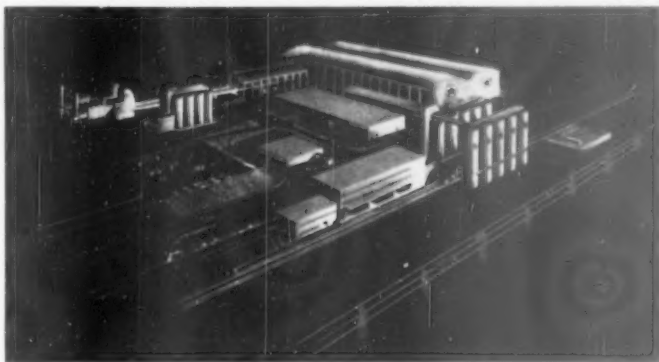
In the storage building, there will be two overhead cranes traveling the full length of the storage, so arranged that the various raw materials can be mixed and delivered into bins feeding the mills.

The mill building will house five large ball and tube mills, two driven by 500-hp. motors and the others by 800-hp. motors. Raw mix will be transported by pneumatic conveyors to the raw mix silos consisting of eight units, each 22 ft. in diameter and 80 ft. high.

There will be two kilns 10 ft. in diameter and 240 ft. long. Natural gas will be supplied by the Lone Star Gas Co. Each of these kilns will produce about 2000 bbl. of clinker every 24 hr.

There will be 15 storage silos, each 26 ft. in diameter and 120 ft. high. Each silo will hold about 13,000 bbl. of cement. In the packhouse, four packing machines will each have a capacity of 300 bbl./hr. The entire shipping department will be arranged so that the maximum amount of cement to be shipped on any single day can readily be handled. The silos, both for the raw mix and cement storage, are being constructed by the Macdonald Engineering Co., Chicago, Ill.

Operation of this plant will require about 6000 hp. Electrical energy will be supplied by the Texas Electric Service Co. All drives throughout the plant will be electric motors.



Architect's drawing of Lone Star's new Texas cement plant

For the maintenance of the plant, there will be constructed a machine shop, fully equipped for all repair work, also a storeroom for the necessary supplies and repair parts. In this building, there will be provided rooms for employees, equipped with the most modern lockers, showers and toilet facilities, a large hall for conferences, safety meetings, etc., as well as for use as a recreation and lunch room.

The plant management office and laboratory will be housed in a one-story building of modern design. This building will be air-conditioned and will have the most efficient equipment for the control of the production process.

Lone Star to Sell Railroad

LONE STAR CEMENT CORP., New York, N. Y., has announced plans to sell its Cloverdale & Catawba Railroad to the Norfolk & Western Railway for more than \$1,000,000, subject to the approval of the Interstate Commerce Commission. The 8 1/4-mile line connects with the Norfolk & Western at Cloverdale, Va., near Roanoke. Lone Star chartered the road in 1949 to haul materials for construction of its new \$6,000,000 plant near Roanoke, which is scheduled to begin operations early next year.

Gets Turkish Contract

F. L. SMITH & Co., the international Danish engineering firm, has signed a contract for the delivery of a cement plant to Smyrna, Turkey, according to the Danish Information Office in New York. Payment is to be effected through the Organization for European Economic Cooperation.

Laboratory Expansion

LEHIGH PORTLAND CEMENT CO.'S Iola, Kan. plant is adding a 15- x 30-ft. two-story addition to its plant laboratory. Also, the old unit is to be remodeled and new equipment installed.

Asbestos-Cement Product

BEST-O-ROCK MANUFACTURING CO., Corpus Christi, Texas, is producing a new stone composition building material. The material, known as "Best-O-Rock" is basically an asbestos-cement product and is produced in 9- x 16-in. shakes (or shingles) with 1/2- to 3/4-in. butts, which produce deep shadow lines that give a stone effect. The shakes are used as a roofing, siding, or wainscoting material, are light in weight and can be nailed in place. The color is mixed into the composition at the time of manufacture. At present, the plant is producing about 2000 shakes per day, but new equipment has been ordered to increase the plant's capacity to 8000 per day. The plant is owned and operated by A. J. McCall, W. R. Brawner and Joe P. Rathiff.

Sells Cement Plant

PUERTO RICO CEMENT CORP., originally established in 1939 by the Puerto Rican Reconstruction Administration, a federal agency, was one of the four industrial plants sold recently to private business. It was stated that this marks "the end of the government conducting its own industries." The cement plant, in 1942, produced 350,000 bbl. of cement, but later increased its capacity to 1,000,000 bbl. per year. The plant earned over \$1,000,000 annually.

Pavement Yardage

AWARDS OF CONCRETE PAVEMENT for the month of October and for the first ten months of 1950 are listed by the Portland Cement Association as follows:

	Square Yards Awarded During October, 1950	During first Ten Months, 1950
Roads	1,834,248	24,851,387
Streets and alleys	1,929,474	22,906,576
Airports	49,500	2,847,536
Total	3,813,222	51,796,499

HINTS *and* HELPS

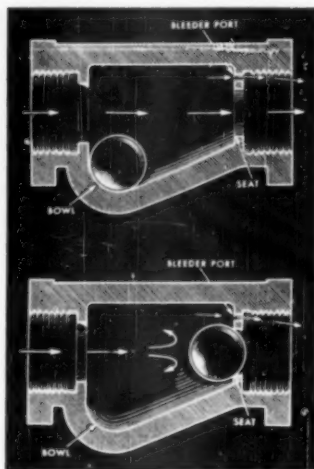
PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Safety Check Valve for Air Lines

THE USE OF AIR TOOLS has brought with it some hazards, not the least of which is the danger from whipping air lines should a break occur. A check valve recently developed would seem to lessen this danger considerably. The check valve is installed at the air outlet on the compressor or manifold and may be placed before or after the shut-off valve.

The valve consists of a steel ball which normally lies in a bowl, permitting the free flow of air. Action of the ball is governed by the velocity of air passing through the valve. When there is restriction at the end of the line, the ball lies at rest in the bowl, thus giving the pneumatic tool full pressure. If the hose breaks or the tool is uncoupled, the rapid escape of air quickly forces the ball into the seat of the valve, checking the flow.

According to the manufacturer, Danielson Safety Valves, Inc., Richmond, Calif., a small bleeder port in the valve seat permits a reverse automatic action; with the ball in checking position, the bleeder port is free to pass air into the hose. When the tool is attached to the end of the line, air pressure builds up until the pressure in the line reaches that of the compressor, or manifold, at which time the ball drops back to resting position by gravity. Changing tools is easily done, for the valve checks the flow of air as soon as the connection is broken at the end of the line. Hooking on the other tool and waiting a few seconds for the pressure to build up completes the procedure. The manufacturer claims that the valve will not release to permit operation of a



Operation of compressed air line safety valve

pneumatic tool if the connecting line has a major break, or if a tool leaks air in large quantity.

Operational Time Recorders for Block Machines

TO REDUCE IDLE MACHINE TIME and to increase operating efficiency, a few producers are using electric or mechanical types of machine operation-time recorders to good advantage. Connected to the block machine, these devices automatically provide a continuous chart record showing when the machine is producing block and when it is idle. At the end of each shift or 24-hr. period, the chart is removed from the recorder case, giving

an accurate record of "down time" for that period. Such charts can be kept as permanent records of machine operating efficiency, and of the frequency, length and cause of idle periods.

Such data will be even more useful if they are compiled on sheet forms or other record forms on which are also shown, for the particular machine and shift, such pertinent data as number of block produced, type and size of block, cement and aggregate quantities, hours worked, reasons for "down time," etc. Analysis of the idle time and its causes will assist in applying corrective measures and increasing machine and plant efficiency.

And Now House Moving

AT A QUARRY OFF the coast of southern California, it was necessary to provide additional living quarters for employes. It was found that the quickest and simplest way to provide the



Moving prefabricated house to quarry housing site

additional facilities was to use prefabricated houses made on the mainland. These were fully assembled, put on wheels and pulled to the dock in Los Angeles for transfer to barges. At the quarry a Bucyrus-Erie walking Monaghan was used to unload the houses to a carryall. A Caterpillar D-8 tractor was used to pull the carryall.

Water Sprays on Flat Screens

WHERE THE PROBLEM of retaining the rejects from a sand and gravel plant is not a problem, and where water is cheap and plentiful, a relatively large amount of water per screen can be used. However, at an operation where just the opposite was the case, a resourceful operator's experiments led to a water-saving method. A flat screen such as the Symons shown lent itself well to an effective spray hook-up; the screen was long enough to permit plenty of drainage space. The picture was taken in a new sand and gravel plant built on the Pacific Coast, and shows the feed or spreader box and the arrangement of the water manifold.



Long flat screen allows greater drainage for saving water

Cylindrical Elevator Housing

AT A WESTERN PERLITE operation several bucket elevators are used, all of which are cylindrical, as shown in the illustration. The housings were fab-



No braces are needed on the cylindrical elevator housing

ricated in the company shop and are made of $\frac{3}{8}$ -in. welded steel plate. Because of their design, the housings needed no additional bracing or supports. The drive equipment was all assembled on the top part of the elevators.

Slope Indicator

IN THE CONSTRUCTION OF tailing ponds it is considered important to know the slope of the face of the dams and of that portion back of the dam, so one operator rigged up the following quick method of determining the



Simple method of measuring angle of slope

slope. It is simply a protractor with a weighted thread attached to it. In this case a bottle opener was conveniently used. To use, the straight edge of the protractor is held parallel to the slope being measured; the point at which the string crosses the quadrant is the angle, read directly in degrees. The photograph is a demon-

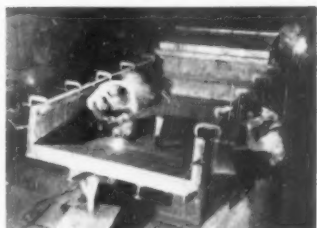
stration of the method, showing the measurement of the pencil line above the protractor.

Underground Crushing Plants

SEVERAL INTERESTING FEATURES were noted in a recent visit to large mining operations in the Southwest. Most of the large copper mines visited are open pit mines and are no different than rock products operations. One company using trucks for pit haulage had the primary crusher, a 66-x 84-in. Allis-Chalmers jaw crusher, installed underground. This crusher is one of the largest in the world. Carrying the crushed rock from this crusher is an inclined belt that goes to the surface and to the top of storage bins. Ahead of the crusher is a so-called "ore pocket," carved out of the rock above; this pocket serves as a bin ahead of the feeder to the unit. The crusher is at such a depth underground that deepening of the pit will not affect it for many years. At all times the unit is free from possible blasting damage.

Abrasion-Resistant Bodies

QUARRY TRUCK BODIES have to withstand a terrific pounding day after day. In the production of heavy-duty



Fabricating truck body of $\frac{3}{8}$ 16-in. heat-treated plate

dump trucks for use in such applications, Moore Body Co., Reading, Penn., has standardized on Jallof heat-treated plate (made by Jones and Laughlin Steel Corp., Pittsburgh, Penn.) to armor body bottoms against impact and abrasion.

These bodies range in capacity from 5 to 16 cu. yd. They are of two basic designs. The stripping body is box-like and has high slightly flaring sides and a tail gate. Rock bodies have lower sides and a slope plate rear that give it a squat appearance. Typical construction of the bed is a sandwich of $\frac{3}{8}$ 10-in. heat-treated Jallof plate on top and bottom and $\frac{1}{4}$ in. oak planking in between. The heat-treated plate has replaced $\frac{1}{2}$ -in. mild steel formerly used. Yet it retains physical properties approximately three times harder and with three times greater yield strength than mild steel. The result of this construction is elimination of nearly 1000 lb. deadweight and a lengthening of service life.

Sand Drag Construction

A SAND DRAG ADAPTED by an Ohio producer to be powered from the head sprocket presented an interesting problem. In order to utilize power from an adjacent elevator motor, the drag was designed with a head sprocket drive. This type drive resulted in the chain pulling up at the rear and passing over the sand. Rather than construct an axle using an expensive water seal to hold down the chain, the following method was employed. The hubs from an old Willys axle were cut



Salvaged car hubs serve as sand drag water-proof chain guide

vertically through the king pins and welded onto a channel iron frame. A 6-in. dia. length of pipe was threaded on each axle, over which the chain rolls. The sealed lubrication of the axle assembly reduced maintenance tremendously. The frame is hinged to permit raising for checking, but after a year's operation, no more than routine lubrication has been necessary. The dimensions of the drag are 14 ft. long, 36 in. wide, and 42 in. deep. The capacity is 50 t.p.h. at 1 f.p.m. A vibrating screen, elevator bucket, and the sand drag are all driven by a 15 hp. G-E motor.

Piping For Future Water Requirements

TAILINGS FROM a sand and gravel operation are run into a part of the pit shown in the photograph. The



Pipe placed in original pit has perforations for possible tapping of water supply

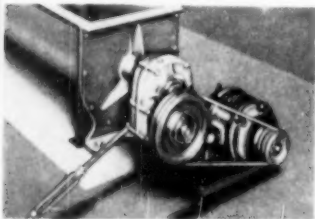
arrow points to a 24-in. steel pipe that had been placed on the bottom before the tailings were admitted to the area. It extends about 16 ft. below the bottom of the original pit and rises about 40 ft. above that level. It is perforated in the lower portions, for the operators feel that sometime in the future a deep well pump may be attached to it to supply additional plant water.

New Machinery

**ROCK
PRODUCTS**

Torque-Arm Speed Reducer

DODGE MFG. CORP., Mishawaka, Ind., has developed a torque-arm reducer for output speeds from 115 to 330 r.p.m. Claimed to be the first shaft-mounted reducer designed for this speed range, the new single reduction unit is being produced in four sizes covering capacities up to 27 hp. Ease and economy of installation of the unit are attributed to shaft mounting which eliminates special engineering, cost of a foundation, flexible couplings, sliding base, and the operation of lining up. It is locked securely to the shaft to be driven by means of two steel locking collars, one on each side of the reducer. It is anchored to the floor or any other fixed object by the torque arm. While the reducer can be driven through any V-belt drive,



Torque-arm speed reducing unit

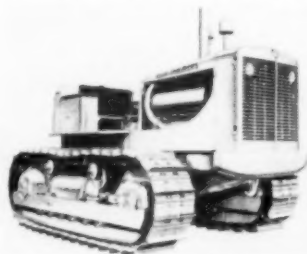
its designers recommend stock taper-lock sheaves for facility either of installation or removal and for maximum efficiency of operation. Flat belt drive can also be used.

Accurate adjustment of belt tension can be quickly and easily made by operating a turnbuckle in the torque arm, and transferring the unit from one machine to another is simplified by use of interchangeable shaft-keyed bushings which adapt shaft sleeves to different sizes. Construction features include machined cast iron housing, deep groove ball bearings and helical steel gears shaved for quiet operation and treated for long life. It is provided with a simple and positive backstop. Wherever required to prevent reversal of load direction, it is easily and quickly installed on the input shaft within the reducer where it is sealed against dust and dirt.

Torque Converter Tractor

ALLIS-CHALMERS MFG. CO., Milwaukee, Wis., has introduced a new torque converter-equipped tractor, the HD-20, whose three-stage hydraulic torque converter eliminates most gear shifting. Operating adjustments, main-

tenance points and major assemblies are so located that care, maintenance and repair of the tractor can be ac-



Torque converter-equipped tractor

complished with the least possible effort and loss of time. Simple unit construction allows removal or replacement of major assemblies without disturbing adjacent parts. Hydraulically powered steering levers offer easy steering control. Adjustable brake pedals, self-energizing brakes, convenient arrangement of other controls insure operating efficiency. A large idler and sprocket and extra long track on the ground provide excellent stability, flotation and traction. Double reduction final drive gives greater ground clearance and permits use of smaller gears and shorter shafts.

New Trailer

ATHEY PRODUCTS CORP., Chicago, Ill., has placed on the market a new high-speed trailer, matched and designed for use with the Caterpillar



Side dumping trailer unit

DW20 diesel tractor. The new unit is known as the Athey PD-20 trailer, the design of which is a semi-bathtub type with modified tapered sides and one low side for easy dumping and loading. The unit can be equipped to dump either to right or to left and is actuated by hydraulic power supplied from the tractor. The trailer has a wheel base of 24 ft. and a tread of 102 in. Bottom of the wagon is constructed of double steel plate with oak fillers to absorb the shock of heavy shovel loading. The new unit is one of the largest built, its manufacturer states.

Conveyor Mounted Swivel Piler

STEPHENS-ADAMSON MFG. CO., Aurora, Ill., announces a new conveyor mounted swivel piler designed to extend the storage range of fixed or portable conveyors. Sand, stone, coal, lime, grain and similar bulk material up to 2 in. lump size are handled. Manufacturer claims that mine tailings and gravel storage areas have been increased as much as 10 times through use of these units.

Material is dropped onto a high speed belt held in a concave path by idler discs on each edge. Centrifugal force presses the material against the

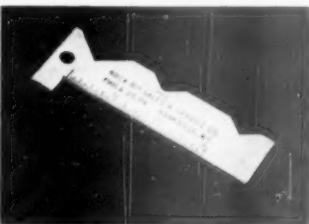


Swivel piler mounted on conveyor

belt and it quickly attains belt speed before being thrown off in a steady stream. Material can be piled at rates up to 50 tons per hour, the designer says. The unit comes equipped with small hopper, adjustable mounting brackets to fit any conveyor and swivel crank and cable for controlling direction of throw. Thrower unit, with 2-hp. motor, hopper, belt wiper and mounting bracket weighs 415 lb.

Reconditioning Gauge

ROCK BIT SALES & SERVICE CO., Philadelphia, Penn., has announced development of a carbide bit reconditioning gauge that will indicate when to grind and the proper angle for grinding a dull bit of tungsten carbide.



Carbide reconditioning gauge

NEW MACHINERY

New Balanced Type Frequency Conveyor

STEPHENS-ADAMSON MFG. CO., Aurora, Ill., has developed a natural frequency balanced type conveyor. The manufacturer says the unit contains such features as low power consumption, low stress coil springs, rubber bushings requiring no lubrication, and that the unit absorbs all vibration within itself. A balance frame, moving in a direction opposite that of the conveyor trough, cancels the thrust due to the inertia of the moving trough, and prevents vibration from reaching



Natural frequency balanced-type conveyor

the mounting frame. Since the conveyor will not "creep," no heavy anchor bolts are required, and it can be easily mounted, or suspended.

Designed to handle practically any bulk or boxed material, its capacity may be varied by specifying trough width and material depth. Troughs may be open, or totally enclosed, and many operations, such as heating, cooling, or scalping, may be performed with special troughs. Simple construction reduces maintenance, with only three bearings and the motor requiring lubrication.

Air Vibrators

SRO INC., Cleveland, Ohio, has announced development of a new series of pneumatic vibrators, designed for intermittent or continuous operation on all types and sizes of storage bins, hoppers, and chutes handling sand, ce-



Air vibrator for bins, hoppers, and chutes

ment, lime, ore, slag and other powdered or granular materials. Designed to deliver powerful, hammer-like impacts in a direction 90 deg. to material flow, these vibrators prevent the contents of bins or hoppers from arching-over or plugging and assure a steady flow through chutes, according to the manufacturer.

A special, corrosion-proof, bronze alloy cylinder is utilized and they have a sturdy, cast semi-steel body and cast steel mounting plate. Vertical construction permits mounting in any desired position. For hopper installations, these vibrators can be used in conjunction with a SPO hopper gate valve, which actuates the vibrator only when the hopper discharge gate is open. This type of operation prevents accidental packing of hopper by premature vibration. The units are available in 1½, 2, and 2½ in. piston diameter sizes, and they are equipped with a ¼ in. rigid or swivel type straight or ell connector for hose attachment.

New Excavator

PIPPIN CONSTRUCTION EQUIPMENT, INC., White River Junction, Vt., has recently placed on the market an excavator for which it claims features of combination digger and loader attachment for tractors. Tractor-powered and hydraulically operated, the unit digs, shovels and loads. Manu-



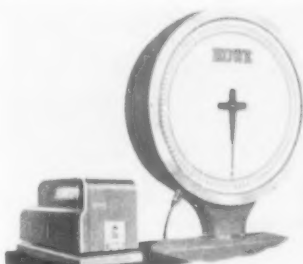
Tractor-powered, hydraulically-operated excavating unit

facturer says the unit digs and shovels to a 7-ft. depth, back hoes by reversing the regular shovel, digs plumb trenches on sides of hills up to 15-deg. grade, back hoes and front hoes a 22-in. wide trench, elevates the shovel bucket 10 ft. above the ground and swings its load laterally in a 110-deg. arc.

Other features of this unit are extra-large surge and reserve tank, heavy-duty pump, 4-valve control with independent pressure ports to provide combination cylinder action, a flow regulator which automatically locks the shovel in position and controls speed of shovel's lateral swing, and unusually large cylinders which assure ample power at moderate pressures.

Teleprint Weight Recorder

HOWE SCALE CO., Rutland, Vt., has developed a new device for the recording of scale weights for use with its tape-drive dial scales. Its manufacturer says the new "Teleprint" unit combines electronic, electrical and mechanical engineering in its operation



Remote-operating electronic weight printer

for scale-reading which it converts to weight printings set up on type wheels for impression on a wide variety of tickets and forms and single and double roll tapes. The recorder uses an ingenious and simplified cam-operated mechanism to translate dial readings into weight printings.

For use with Howe cabinet (drop weight) dials, an additional feature of electric and remote operation of unit weights has been developed. Suitable interlocks are used to prevent printing until correct number of weights are in the system; and a control panel allows operator to control weight printing from remote location by indicating when weights are to be added or removed. With the cabinet drop weight models, the Teleprint automatically adds and integrates the unit weight additions to the total weights. Recorder print button circuit may be extended to conveyor line or lever systems so that passing of boxes or loading of hoppers and tanks can be registered and weight will be recorded when scale comes to a balance. Printings can be made as fast as every five seconds on dial combinations and on the drop weight models from one every five to ten seconds.

Gear Grease Applicator

KEYSTONE LUBRICATING CO., Philadelphia, Penn., has introduced a cartridge open gear grease and gun applicator designed for open gear service. Keystone grease No. 32 is supplied in cartridge form to fit a specially nozzleed gun applicator which ribbons the grease and frequently allows application while gears are moving. Manufacturer claims the grease is water repellent, has high resistance to removal, a melting point above 400 deg. and plasticity with temperatures below freezing. There is also density suitable for sub-zero applications.



Loading gravel in the quarry



Stockpile area near plant office

LOW UNIT COST GRAVEL OPERATION

Graham Bros., Inc., El Monte, Calif., keeps plant uniformly loaded to full capacity; large haulage equipment and surge pile supply 1000 t.p.h. plant

BECAUSE THE GRAHAM BROS. plant at El Monte, Calif. has been revised in so many ways, it will be of particular interest to those of the industry who attended the National Sand and Gravel Association meeting in Los Angeles in 1947, and will possibly remember that the garage was transposed into a dining room for guests who attended the complimentary dinner extended to them by southern California producers.

The origin of the gravel deposit in the area is also of interest. The San Gabriel river originates in the San Bernardino mountains (Sierra Madre) near Mt. San Antonio, better known as "Old Baldy." It is a region of flash floods and during past geological periods vast amounts of material spewed out of this canyon and fanned out over a wide, flat, delta-like area. All the important highways going into Los Angeles from the south or southeast cross the San Gabriel river, now dry for most of the year since control dams have been built in the canyon. Floods will no longer inundate the area.

When the San Gabriel river leaves the steeper mountainous area it separates. One leg is called the San Gabriel "wash," the other the Rio Hondo. Each river now drains independently into the Pacific Ocean to the southwest. The delta-like area formed by the San Gabriel consists of deep beds of excellent gravel and the material is spread out over an area of several square miles. During the dry season (May through November) the

By **WALTER B. LENHART**

water table is seldom above 150 ft., and deep pits can be operated without the necessity for excessive pumping or dewatering. Character of the gravel ranges from excess sand to excess coarse gravel, the latter sizes running up to 18 in. to 30 in. in diameter. The area is literally dotted with important sand and gravel operations, for here material can be trucked into the heart of Los Angeles, a distance of about 15 miles.

In heavy construction years most any type of gravel deposit can be operated, but in leaner years the quality of the deposit is the backbone of the company. It must have operating advantages. Selectivity of type and size of material should be possible. If the market calls for a coarse size one week, and a smaller one the next, the advantage becomes the operator's if he can meet the demand. The difference between trucking uphill 50 ft. or 150 ft.—the difference between pumping no water and little water, the difference between stripping a lot and none—all these can add up to important competitive advantages during the lean years.

The Graham brothers started in the rock business in Long Beach and secured their material mostly from Catalina Island off the coast of San Pedro. During the 1930's they moved into the area just discussed. The company was incorporated as Graham Bros., Inc. Russell Graham, vice-presi-

dent and general manager, has been gradually assuming more responsibility for the management.

Low Cost Operation

The Graham brothers were all essentially operating men, and when they selected the deposit they now operate near El Monte, it was a section that included parts of both the San Gabriel and the Rio Hondo washes. Little or no stripping is necessary there. Gravel lies to a known depth of 1500 ft., and laced through this area are important highways and power lines. With these conditions as the foundation, and headed by men who are sound operators, the result is one of the lowest cost operations in the United States. This belief is also held by some of the executives of large and nationally known aggregate companies.

At first glance the Graham Bros. plant at El Monte is not an imposing structure, but careful study will show the operating techniques that account for the reputation for low operating costs. At first one is somewhat amazed to find that the plant is turning out 1000 tons per hour. That's a lot of material to put through what looks like a relatively small plant. The secret seems to lie in the idea of keeping everything running and loaded to ton capacity, and even overloading a little if need be.

One can get a picture of the whole operation by standing alongside the 48-in. conveyor belt that takes the material from the primary crusher to the new surge pile. This belt is load-



Left to right: Charlton Dunn, Jr., production manager, I. W. Newport, plant superintendent, and J. S. Abrams, plant manager

ed to its maximum capacity, and it's kept loaded. On the 48 in. of width that the belt has, 44 to 45 in. always appears to be covered with material. Nearby is a small glass-enclosed structure in which the operator of the primary crusher, who is the general operator for that part of the plant, is stationed.

When hauling from the closer Rio Hondo deposit where most of the excavation is done, a Euclid bottom-dump, hauling 30 tons per load, dumps on the run to the hopper serving the primary jaw crusher about every one and one-half minutes. When hauling from the most distant San Gabriel wash areas the Euclids pull a trailer with a total load of 50 tons each. There are four of these bottom-dumpers which make 12 trips per hour. Each truck is numbered. The operator in his station keeps a record of the

truck's number and the exact time it arrived. Also, easily in his view are signal lights; 100 percent load is indicated by a red light. If an overload occurs at 110 percent a horn blows. As a general rule the 100 percent load is adhered to.

Truck Hopper Innovation

The trucks are powered with General Motors diesels. The primary crusher is a 24- x 36-in. Traylor Bull Dog and it is fed by a Jeffrey vibrating feeder-grizzly. The feeder is about 6 ft. long and the lower end is a 2 ft. section of grizzly, so the fines in the pit-run bypass the crusher to the off-bearing belt.

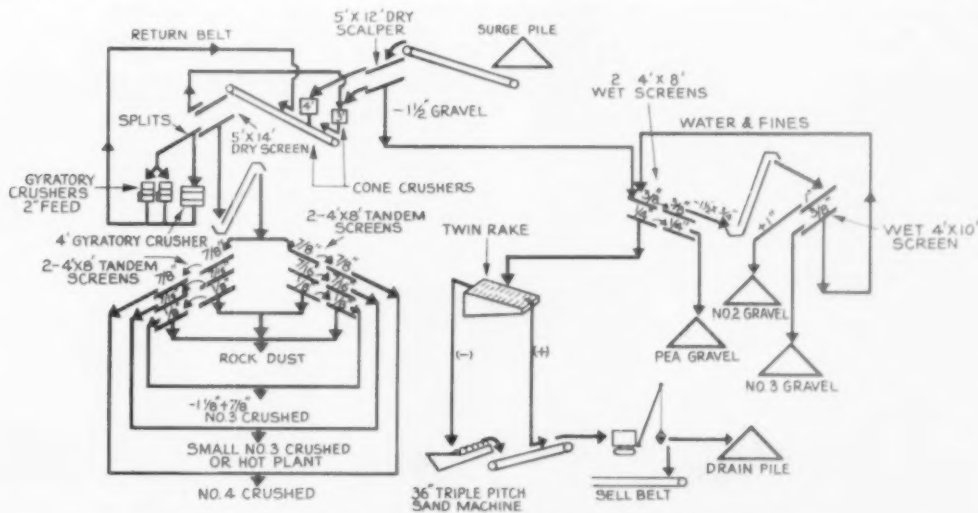
The truck hopper is a Graham innovation which is utilized as more than just a truck hopper. Its top is at the approximate plant ground line elevation and it is of concrete con-

struction. Two wide steel channels are placed across the top of the hoppers and are suitably spaced so that the bottom dumpers can function with practically no spill. The channels that receive the truck tires are also so designed that once each shift a road grader is sent across them; any spill is pushed in the hopper so that no time is wasted with a shovel and broom. The openings are wide enough to receive any rock or gravel the pit can produce. Just below the trackway is suspended the grizzly. The high end is hung from one of the channels by heavy steel cables. It is sloped sufficiently so that any gravel in excess of about 16 in. in diameter will slide off the grizzly to the waste area below.

Loading in the pit is done by a Bucyrus-Erie 120-B electric shovel that



At top center can be seen the scalping screen, and at middle right is the 4-ft. standard cone crusher



Flowsheet of sand and gravel production at Graham Bros. plant at El Monte, Calif.

swings a 6-cu. yd. Esco (Electric Steel Foundry, Portland, Ore.) bucket. Three passes with the bucket loads the truck. The pit at the Rio Hondo area is operated on a bench system and a second cut was being made at time of inspection. It was about 40 to 45 ft. high. At the time of inspection the Los Angeles markets were demanding minus 1-in. sizes of gravel, so a wide strip was being mined that predominated in the smaller sizes of gravel. Washed concrete sand, No. 3 gravel, and No. 4 crushed rock make up the plant's biggest output.

Even though flood control of the Rio Hondo and San Gabriel rivers is closely controlled, the officers of the company are "water conscious" and mindful of flash floods, so at strategic places in the area being mined, gently sloping inclined roads have been provided so that pit equipment, the 120-B shovel, etc., can easily be moved out of water. Although the areas of gravel controlled by Graham Bros., Inc., are very large, the heads of the company are looking ahead to the time when they may have to dig below the 150-ft. water table and to the possible use of a large dragline with excavation to as deep as 250 ft.

The surface of the area being mined is dotted with some desert-type brush but this does not present a great difficulty. Any stripping necessary is aimed primarily at removing this brush, for the surface material is essentially sand and gravel.

Surge Pile Assembly

The new surge pile assembly is one of the features of which Paul Graham, president of the concern, is rightly proud. It has not only helped solve many plant operating problems and permitted the pit to operate in a smooth and continuous manner regardless of what the plant does, but also has allowed the plant to operate continuously and smoothly regardless of what the pit did, and it has re-

sulted in smoothing out matters of gradation and blending of pit materials. Gradation of sand produced over many months time varies so little from day to day that it is insignificant. The surge pile belt has a vertical lift of 83 ft. and about half of the lift is out of the broad pit in which the primary crusher rests. The belt is a B. F. Goodrich Co., super long life 10-ply belt with 7-cord plies and 4-woven plies. It has a $\frac{3}{8}$ -in. cover with two breaker strips and a $\frac{1}{4}$ -in. bottom cover with one bottom strip. Its total thickness is about 1 $\frac{1}{4}$ in. It is powered by a 150-hp. motor, which like many others in the plant is provided with an ammeter for visual observation of the loads handled.

A 48-in. belt reclaims from the surge pile and is fed by another Jeffrey vibrating feeder.

In these data we are not concerned with a detailed description of the plant itself. Interested persons can get the essentials from the flow diagram included. As the plant of Graham Bros., Inc., is an efficient and low-cost producer, the discussion will be confined to some of the reasons behind this efficiency.

All of the plant's output is hauled by trucks although railroad facilities are close to the plant. To use them, trucks must play an important part. To move 1000 t.p.h. with trucks means that an efficient traffic system must be maintained. Trucks move in and out of the yard and plant, from the hot black-top plant, from the company ready-mixed concrete plant, on a road system that is set up for one-way traffic. All roads are properly marked to indicate the directions of travel, and all trucks and staff automobiles must adhere to the plan. Even the entrance to the Graham Bros. operation on Peck Road has a wide sweep to it from two directions so that trucks and their long trailer set-ups can easily make the turn. Semi-circular brick walls on both flanks

of the entrance carry the company's name. This entrance, plus the two large gantry cranes used in the plant, are the guide-posts to the plant.

Graham Bros., Inc., has a large fleet of its own trucks; these are known throughout Southern California and recognized by their two-tone color of grey and brown with brown lettering.

Due to the character of California trucking laws, trucks and trailers operate with a relatively long wheel base. The state highway department of California has designed this law with the intent of spreading the load over the pavement as much as possible. Hence, one might say within limits, that the longer the distance between front truck axle and rear trailer axle, the greater the permitted load. The maximum is 56 ft., so when trucks and trailers have to be weighed, most producers in the area have a single scale platform that is 60 or more feet in length. But Graham Bros., Inc., functions differently. First, there are a lot of trucks going out of the plant that pull no trailer, and second, the company wants to know the weight of material in both haulage units, so the Graham ingenuity shows again: two separate scales are provided whose platforms are so close together that it looks, at first glance, like a single platform. Two scale dials are in the weighmaster's house. Thus, if a truck and trailer are weighed, each unit can be recorded separately. Or, if no trailer is being pulled, two trucks can be weighed at the same time. The installation of two truck scales of small dimensions is possibly cheaper as to first cost than a longer platform scale.

Water Spray Device

All company trucks after they leave the scales drive under a water spraying device that is semi-automatic in its operation. The truck driver, on approaching the spray, reaches out

(Continued on page 136)



Bottom dump truck is shown dumping on the run to primary crusher below, which is a 24- x 36-in. jaw crusher



New surge pile from primary crusher is built by this 48-in., 10-ply belt, kept loaded to its full width



Two gantry cranes are used to reclaim material to the ready-mixed concrete plant or to the hot mix plant

THE NATIONAL GYPSUM COMPANY STORY

By PAUL HORNBERG

Sound policies have built company to a twenty-three plant organization and \$75,000,000 volume of business in its 25th year

ON AUGUST 25, 1950, National Gypsum Co. of Buffalo, N. Y., held a formal celebration of its twenty-fifth anniversary on the site of the company's first plant at Clarence Center, New York. It was from this plant, recently rebuilt and modernized to a high state of operating perfection, that the company's first product—gypsum wallboard—was shipped in June, 1926, precipitating a 25-year period of growth and development almost unprecedented in the history of American industry.

From that beginning, based on a single idea for an improved type of gypsum wallboard, backed by the enthusiasm, ambition and faith of the three founders of the company, a business enterprise was started that has grown rapidly and without letup. A \$75,000,000 volume of sales will have been realized in 1950.

National Gypsum Co. produces a complete line of related building products sold under the "Gold Bond" trademark, exclusively through 15,000 lumber and building supply dealers serving all the United States east of the Rocky Mountains. It employs 5000 people, has 15,000 stockholders and produces over 150 distinct products at 23 plant locations.

Since the beginning of the company, diversification of products has consistently been emphasized with the result that gypsum products now comprise just one of seven major divisions of the company, which include gypsum, lime, rock wool, acoustical materials, insulation board, metal lath and various base materials for industrial use. Gypsum products account for approximately 62 percent of total production, lime for 9 percent and rock wool for 8 percent.

Accomplishments

National Gypsum Co. operates ten strategically-located gypsum plants, four lime plants and three rock wool plants, all of which are among the most modern high capacity operations in the industry. At the close of 1949, the company



Exterior view of the Clarence Center, New York, plant.



Meeting headquarters of the National Gypsum Co.



Exterior view of the Clarence Center, New York, plant.



The nerve center of National Gypsum Company's far-flung operations: the main office in Buffalo, N. Y.

had a net worth of \$48,100,466 and a net income of \$9,458,853 before taxes, resulting from net sales of \$59,439,883 for that year.

At the close of 1949, earnings for the year represented \$2.57 per share of common stock, with 2,112,336 shares outstanding, wages and salaries paid during that year totaled \$16,378,600 and total assets of \$66,468,425 were reported. Current assets were seven times the amount of current liabilities. Value of property, plants and equipment totaled \$41,000,000 including more than \$38,000,000 for buildings, cargo vessels for the transport of gypsum rock, machinery and equipment, and well over a million dollars in gypsum and limestone deposits.

The estimated net worth of the company at the end of 1950 is \$55,500,000 and \$10,000,000 net profit is anticipated.

Over the 25-year period, National Gypsum Co. has produced and sold more than \$500,000,000 worth of products including sufficient gypsum board to build the walls of 3,500,000 average 5-room homes. It has earned approximately \$45,000,000, paid out \$131,000,000 in wages and salaries, paid more than \$19,000,000 in dividends and nearly \$35,000,000 in taxes. Outlay in taxes, incidentally, exceeds more than one-half current assets and the amount paid in 1950 alone, approximately \$6,800,000, is one-fifth the total paid over 25 years. Dividends paid in 1950 totaled \$2,960,000.

The records reveal that almost 2 billion sq. ft. of board products were produced in 1950; over a half million tons of plaster in 1950, and about 3,000,000 tons of gypsum and limestone were mined and quarried in 1950. It takes \$25,000,000 worth of

transportation a year to keep the products and materials moving and, among materials required, the company buys 150,000 tons of coal a year, 20,000,000 gallons of fuel oil and 24,000,000 paper bags for plaster, lime and rock wool.

That any company could grow from nothing to the status that National Gypsum Co. enjoys today, in the space of 25 years, is nothing short of amazing and a tribute to resourceful and aggressive management. It was accomplished over a period of years that embraces some of the most hectic and unfavorable times for business expansion in the nation's history. The new company had to buck competition from well-entrenched companies from the start. It had to survive severe price-cutting wars starting in 1927 which wiped out some gypsum manufacturers, and was faced with patent infringement lawsuits while in the process of getting established; it then had to weather the worst depression in history and came through World War II into the high tax post-war years as a powerful, well-established and greatly enlarged concern. Then came one of the most ambitious programs of expansion in any industry.

Almost \$4,000,000 was invested in building new plants, and in enlargement and modernization in the 1943-1948 period alone. As a result, production has been doubled, products improved and operating efficiency bettered to meet greatly enlarged demands and in anticipation of highly competitive merchandising conditions. That tremendous investment in productive facilities, fortified with new products and proportionate added selling power, has put the company in the strongest economic position in its

history in answer to the inflationary trend and spiraling wages. Today, the investment in production facilities is \$8379 per person employed.

It is noteworthy that, with the exception of the four war years when the company's facilities were turned over largely to production for war and defense needs, the company showed substantial increases in sales and profits for each year. Profits were realized throughout the depression years in the 1930's and the company embarked on one of its characteristic expansion programs during those years, that doubled its productive capacity. Its most dramatic advances were made in the 1937-1950 period, during which its assets were increased from \$12,000,000 to \$66,000,000. Five gypsum plants and a lime plant were acquired in 1935 alone, and two more plants in 1936. It has been said by authoritative business analysts that during the 1932-1937 period the National Gypsum Co. expanded more rapidly than any company in America.

The accomplishments of the National Gypsum Co., in the face of all the obstacles to expansion during times when it made its greatest gains, exemplifies the American system of free enterprise in operation. It all started with a single idea backed by the conviction that the new enterprise could survive and grow. The initiative, daring and imagination of President Melvin H. Baker saw the enterprise through the early years when the company fought for its very existence, and have continued to determine the policies that carried it through the 1929-1941 period when the company expanded in order to survive and have been the compelling and guiding force in the climb to prominence. Mr. Baker continues to exert



Melvin H. Baker, president



William M. North, secretary



Richard H. Means, controller



Walter S. Corrie, treasurer

top leadership and to formulate the policies that have guided the company forward during the postwar years, ably assisted by an organization of experts in management which has been built from the ranks to carry on the policies and traditions that have established the "Gold Bond" trademark.

It is significant that during 1950, the company was honored three times through its president, Melvin H. Baker. The board of directors of the United States Chamber of Commerce elected Mr. Baker a director. On May 18, during the mid-century Boston Jubilee dedicated to the founding of American Democracy, he was one of 50 outstanding businessmen presented awards for industrial statesmanship based upon unusual and meritorious contributions to the American way of life. The alumni of the University of Buffalo Graduate School of Business Administration selected Mr. Baker as the businessman of the year on the Niagara Frontier.

The story of the National Gypsum Co. reads almost like a fairy tale, and one that should be an inspiration to other enterprising companies. It embraces far more than phenomenal growth and unerring judgment in its decisions to expand. Behind it all have been sound policies that have determined and dictated every step forward and which have governed the company's actions with respect to labor, safety, research, merchandising and organization. The company believes in labor's rights to organize and

to bargain collectively and because of its sincere interest in its workers and their rights has been remarkably free of labor difficulties. No major strikes have been encountered and the company has never been accused of an unfair labor practice. In safety, the record is outstanding; a program to reduce accidents started in 1937 has been effective in reducing the accident frequency rate 73 percent to a figure of 9 for 1950 which compares very favorably with similar industries. The severity rate has been cut 70 percent. Research has been given top priority from the beginning of the company and has been responsible for the development of many new products and processes that have been essential to growth of the company.

The policy with respect to sales of building materials has held from the beginning when the practice was instituted to sell only through reputable and qualified lumber and building supply dealers. Growth of the company has paralleled the growth of its dealer organization and increases in productive capacity have been met according to the growth of dealer sales outlets and their requirements.

National Gypsum Co. has made business history and the editors believe that its policies and its methods of operation are of interest and hold practical value to other companies and industries; accordingly, we devote a large part of this issue of *Rock Products* to the growth of the company, its policies and all phases of its current operations including production.

Early History

Joseph F. Haggerty, Clarence E. Williams (both deceased) and Melvin H. Baker founded the company in August, 1925, with Mr. Haggerty as its first president. All three men formerly had been associated with the old Beaver Board Co. There had been criticism of gypsum board by the building industry, which claimed that gypsum board then on the market was too heavy and brittle. The idea that sparked the start of the new company was a new method to manufacture a lighter board of higher strength and which would be more resilient. It consisted of intermixing scrap paper with the calcined gypsum before fabrication into board, thereby contributing to higher tensile strength and greater resiliency in a board weighing some 30 percent less than others on the market.

Mr. Baker had been sales manager of the old Beaver Board Co. and was brought into the company as secretary and director of sales with a reputation as a dynamic merchandiser. It was his lot to put over the new gypsum product and, as events proved very early, he was the driving force that not only put over the product but built the company throughout the years.

A million dollars was needed to build the plant at Clarence Center on the site of an excellent gypsum deposit just outside Buffalo. Investment experts could not be interested in the new venture because of the tough competitive situation in the building



Lewis R. Sanderson, vice-president in charge of operations



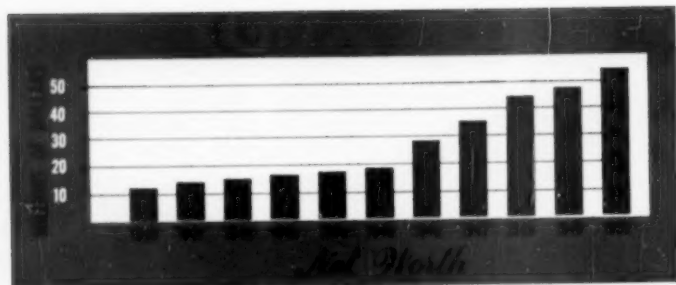
Charles E. Masters, vice-president in charge of finance



Dean D. Crandell, vice-president in charge of sales



John C. Best, vice-president in charge of export and special contract sales



industry at the time so the founders raised \$125,000 between them and then set out to sell shares of stock to their friends. Required funds were raised in three months and work was then started on the plant and on development of an underground mining operation to get out the rock. Production of gypsum board started in June, 1926, with 50 employees, and a small but experienced sales force set out to sell the product.

The sales strategy was to demonstrate to dealers the properties claimed for the new board by actually supporting a sample of board on two sawhorses and loading it down with sashweights until failure. Then followed a similar demonstration with competitive boards and it was up to the dealer to judge for himself whether or not he wanted to buy. That is exactly how National Gypsum's first product was put over. At that time, Mr. Baker stated the sales policy of the company that has held throughout the years. He said to his salesmen, "It is our intention to supply the dealer with products *obviously* better than competing products, and at no higher prices. We are going to limit the distribution of our products wholly to lumber and building supply dealers."

This sales pattern was new to the building materials dealers, who had suffered badly from price-cutting practices and discriminatory prices because at that time builders could often buy direct from plants at the same prices dealers would pay. The

dealer was in competition with hardware stores and all manner of other outlets.

After establishing the dealer sales policy, based upon the opinions of the dealers themselves as to how to stabilize the industry for a fair profit, the company backed its protective pledge to dealers by signing a contract for a series of full-page advertisements in the *Saturday Evening Post* playing up its dealers. The new policy soon proved a big success but then followed a long-drawn out price war and a period when the question was whether or not the company would survive.

The answer to the price war was expansion into new territory, previously closed to the company because of high freight rates, with the building of a second plant at National City, Mich., in 1927. A second million dollars was raised for the purpose. By 1929, the company began to produce gypsum plaster which was beginning to replace lime plaster and thus greatly increased the market for gypsum. Then followed the making of gypsum lath and a variety of new tileboards and decorative wood-grained wallboards.

Joseph Haggerty died in 1928 and Clarence Williams was forced to resign because of ill health, with the result that Melvin H. Baker was elected president in 1929. By that time threatening lawsuits had been settled and competitive practices had improved. The company anticipated

the impending economic crash which reached its crisis on October 29, 1929, and had its plans ready. It had cash and had not permitted itself to become indebted on short-time paper as many other companies had done.

Mr. Baker saw the answer to the depression in expansion and diversification to build markets despite the fact that residential building contracts had fallen off a billion dollars or more in the space of one year, with further drops anticipated. It was his conviction that the company had to make more products, that more dealers had to be added and advertising increased to promote sales.

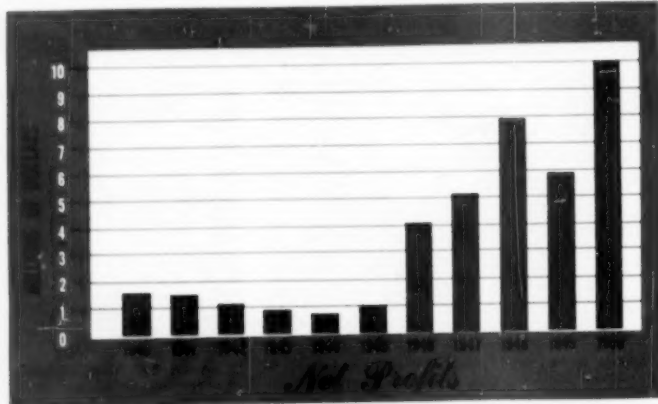
Advertising was directed to showing people how Gold Bond products could be used to repair homes and offices. New products were being added and research was accelerated toward development of more of them, a line of new decorative wallboards was introduced and in 1931 some 30 items were being marketed. A profit was realized in 1930.

In the 1930's, steps were being taken toward the long-range objective that the company should be in position to supply the building industry with a full line of related building products that would be standardized. In 1932, the patents, name and goodwill of the Macoustic Engineering Co., which had specialized in sound-absorbing plaster were purchased, as a logical move in order further to contribute to the needs of the building industry. As the result of research in acoustics, new sound control products were developed, some being acoustical tile of mineral wool, of wood fiber and of perforated metal surfaces.

Since metal lath was the accepted base for plaster in large buildings and certain classes of homes and was necessary if the company intended to offer a complete line of wall and ceiling materials, the company went into manufacture of that product in 1934 with purchase of the Kalman Division of Bethlehem Steel Co., Niles, Ohio. Completely new machinery was designed to bring the plant up to date. A high quality finishing line was then considered necessary and the company acquired a shaft-kiln lime plant at Luckey, Ohio, located in the world-famous magnesium limestone area in northwestern Ohio, thereby adding finishing lime, mason's lime, industrial and agricultural lime to its line of products.

Building contracts in 1934 slumped to 29 percent of those in 1929 but the company was then competing in wallboard, plaster, lime, metal lath and acoustics and, as a result, sales volume actually had increased. Expansion was paying off and the company reported increased profit.

Manufacturing capacity was doubled in 1935 by acquisition of the Universal Gypsum and Lime Co. through a stock transaction. By this single move, five gypsum and lime plants were added and, immediately, a mil-



lion dollars was spent to modernize them. This was done at a time when building was at an all-time low which made the move seem hazardous on the surface but, until then, the company had been limited in its ability to ship into certain markets. Freight rates for long hauls were cutting into profits to the point that expansion, territorially, was limited. Suddenly, the company was in position to compete in the northwest, southwest and south with new gypsum plants at Akron, N. Y., Rotan, Texas, Fort Dodge, Iowa, and Baltimore, Md., and a new lime plant at York, Penn.

Then came acquisition of the Atlantic Gypsum Products Co. with plants at Portsmouth, N. H., and New York City, together with enormous deposits of gypsum located on the tidewater at Nova Scotia which were desired to supply gypsum in cargo ships to existing plants and others to be built serving the large seaboard markets. The fact that freight from the Clarence Center plant into the principal seaboard markets was \$6.50 a ton whereas gypsum could be quarried and shipped by cargo ships from Nova Scotia for much less dictated the move.

The Craftex Co., manufacturer of water-thinned paints, came along with the deal so National Gypsum Co. entered the paint business. Through research, improved flat paints were then introduced.

Best Bros. Keene's Cement Co. was purchased in 1937 in exchange for National's common stock and, along with the transaction, John C. Best, president of that company, became a vice-president of National Gypsum Co. Best Bros.' operations at Medicine Lodge, Kan., gave National Gypsum Co. control of the purest white gypsum in the United States, from which calcined gypsum is manufactured for many industrial uses and from which the well-known Keene's cement and white ranging plaster are made.

In his report to stockholders, Mr. Baker then said, "Best Bros. completes our line of gypsum products until research finds something new. With the completion of our plants in Nova Scotia, our plants on the Atlantic Coast and acquisition of three cargo ships and the modernization of our mills in the West, distribution on our gypsum products is now completed for all markets east of the Rockies."

Next step in the far-seeing program to broaden the Gold Bond line was the building of a plant at Mobile, Ala., to manufacture fiber insulation board from second-growth waste pine. Raising of the \$1,500,000 required to build the plant was easily accomplished. News of the company's rapid growth during the depression interested New York financiers and it remained only for Mr. Baker to tell the story of insulation board and point out the possibilities it presented to capital.

Financial structure of the company

was changed in 1937 as the result of having proved that capital could be raised privately. It was decided to list the company's securities on the New York Stock Exchange in order to attract the investing public, as a sound basis for the future raising of capital.

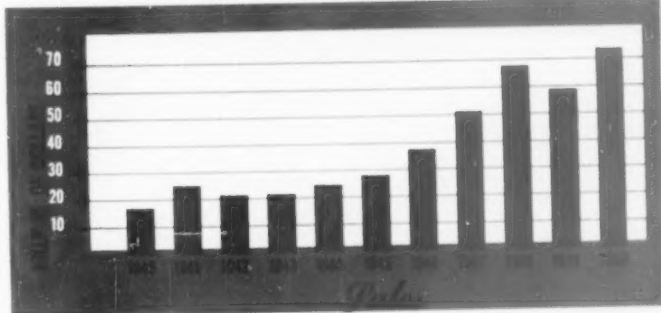
During the late 1930's, two lime companies were acquired and the General Insulation Materials Co., with three rock wool plants, was purchased.

The foregoing has detailed the highlights of the development of the company up to 1940. At about that time a plan was set in motion to make the company self-sufficient for its more important materials and supplies and new sales policies were being put into

effect only to be interrupted by World War II.

be expected of National Gypsum Co., the plant, employing 5000 munitions workers, was completed months ahead of schedule, was operated for three years on around-the-clock schedules without fatal injury and had a high rating for efficiency. Bluebonnet won the Army-Navy "E" award with two star citations for its performance.

Among other wartime accomplishments were the adaptation of mineral wool to deaden the sound in airplane engine test cells, the manufacture of 250,000 tons of airplane landing mats at the Niles, Ohio, metal lath plant, which won the Army-Navy "E" for excellence of production, and the development of a method of laminating layers of gypsum wallboard together to serve as weatherproof siding, roof



effect only to be interrupted by World War II.

Wartime Accomplishments

On December 8, 1941, the day after Pearl Harbor, president Baker wired Secretary of War Henry L. Stimson, "The management of this corporation believes that business should go all out for quick, decisive victory over Japan, and to this end, this company's resources, technical knowledge and the production at its twenty-one plants are at your disposal."

Already, some 25 percent of the company's total plant output had been diverted to defense production and the percentage quickly grew following the declaration of war. Tremendous quantities of gypsum board and insulation board, rock wool and other products were required for the building of cantonments, training schools, housing for defense workers and munitions plants. Rock wool was shipped in great quantities for ship insulation, and the production of chemical lime for steel, rubber, paper and glass manufacture was rapidly increased.

Bomb-loading was a far cry from the manufacture of building materials but, in February, 1942, the company signed a contract with Army Ordnance to build and operate the Bluebonnet Ordnance Plant at McGregor, Texas. Lewis Sanderson, now vice-president in charge of operations, was selected to handle the job. As would

decking, and interior walls as a replacement for critical steel in construction.

Gypsum molds were developed for the manufacture of self-sealing airplane gasoline tanks and for the production of precision castings.

Postwar Expansion

During the last years of the war, surveys indicated a tremendous backlog for new homes due to a long period of under-building and the forced suspension of private building since 1941, which was further aggravated by the need for repairs for all classes of building. A study of the markets, and plans for studying plant additions to meet the postwar market were the responsibilities of a Postwar Planning Department created in 1943 under the direction of vice-president Dean Crandell. The addition of two new plants was first recommended. One was a new gypsum plant at Baltimore, Md., which would be supplied gypsum rock from Nova Scotia by cargo ships. This territory had previously been supplied with gypsum products from other plants at great sacrifice in freight charges. A second step was the purchase of high calcium limestone deposits and the construction of a plant at Kimballton, Va., to serve industry in the southeast.

When the war ended in August, 1945, a plan that called for doubling prewar productive capacity and complete modernization of all plants to

cut costs and improve quality was presented. The plan, requiring the expenditure of more than \$37,000,000 and an addition of \$5,000,000 to working capital, was approved by the board of directors. It was decided to supply part of the funds through long-term bank loans. The public purchased \$15,000,000 worth of stock and, while the postwar expansion program was being completed, an additional \$15,000,000 was taken from earnings.

One of the first moves was purchase of three 10,000-ton cargo vessels from the Canadian government, which were reconditioned for transporting gypsum rock from Nova Scotia to the seaboard plants. Irregular shipments had hampered deliveries and this was an important step toward the self-sufficiency that the company considers essential. A new rock wool plant was added at Mansfield, Mass., a second paper mill at Garwood, N. J., and a third later at Kalamazoo, Mich., one having been previously purchased at Newburgh, N. Y. These steps were taken to insure adequate supplies of paper of uniform quality for gypsum board liner and to effect substantial savings in costs.

Expenditures for the three cargo ships, the Mansfield rock wool plant and the Kalamazoo paper mill totaled in excess of \$3,500,000. Construction of the Kimballton, Va., lime plant, the Baltimore gypsum plant, the new wallboard plant and mine mechanization at Clarence Center, and for modernization of the rock wool plants at Alexandria, Ind., and Dover, N. J., totaled in excess of \$13,000,000. Approximately \$15,000,000 went into modernization of other plants and acquisition of paper mills. Total investment was slightly under \$36,000,000.

This ambitious program of expansion together with the program of integration in process to attain utmost efficiency in all the plants is startling, and its advisability at a time of such extremely high costs for equipment and buildings was questioned at the time of its undertaking by skeptics. Mr. Baker's answer is a simple one—a 75 million dollar volume of business in 1950 and 10 million dollars in profits.

While the program cost more than anticipated, management felt that it must be put through in order to meet the demands of dealers and industrial customers. Characteristically, Mr. Baker stated, in justifying the company position, "Taking advantage of improved methods of manufacture in order to make more and better products at competitive prices and in time to satisfy our dealers' delivery requirements—is the best way we know of to grow and to provide better jobs for our employees and security for our investors."

His philosophy has always been the reverse of a "planned scarcity" program and he has proved it sound to plan for the future by pouring mil-

lions of dollars into the plants. In one of his reports to stockholders he said, "We would soon find ourselves sliding backwards—losing ground to competition—if we failed to invest money in new equipment."

The postwar program was but a phase in the pattern conceived as a result of experience of years ago when it became evident that big companies, capable of producing great volumes of products at low cost through their ability to buy machinery and which could build and support dealer organizations, advertise nationally and conduct research would be the only ones that could survive in competition.

That pattern has been one of expansion to the utmost for low-cost, efficient mass production; development of a diversified line so that dealers would be able to buy all their needs from one manufacturer—"The Gold Bond Idea"—; the building and maintenance of a dealer organization commensurate with capacity to produce; and control or acquisition of sources of raw materials.

Sound financing has been made available whenever needed to carry on the company's rapid development. The owners of the business—its stockholders—have been called upon more than once to forsake dividends with an eye to the future and permit the use of earnings for machinery and plants to support its growth. No dividends were paid holders of common stock for the first 14 years of the company's existence in order to plow back funds into the business, and it wasn't until 1939 that as much as 25 cents per share was paid. A greater percentage of profits than customary for most businesses of high earnings has been re-invested in expansion with the expectation of increased returns later, now being realized.

Current Status Production

As of the close of 1950, all of the plants are equipped to produce at an accelerated rate, all the older ones having been mechanized to the fullest extent and modernized to benefit from the latest developments in machinery and methods. While the Baltimore plant is the newest and represents the last word in operating methods, the oldest plant at Clarence Center now has almost identical processes and equipment. Among the latest completed developments have been the mechanization of quarry operations and construction of new crushing facilities at the York and Luckey lime plants, and a major program has just been announced for the Fort Dodge, Iowa, plant, to round out its capacities for balanced operations.

Currently, emphasis is on adjustments at the various plants to balance operations for the utmost in capacity and in improvements in material handling and installation of equipment for new products. These improvements and installations, be-

fore undertaken, must satisfy one of three requirements. The estimated annual income created must at least equal one-third the cost of the improvement as one criterion; or be considered necessary to the manufacture of new products, to increase income, for market diversification or to strengthen the company's competitive position; or be essential to the maintenance of continuity in production, or for its contribution to safety, sanitation or other conditions needed to achieve better labor relations. Throughout all building and improvement programs, emphasis has been given to reducing the hazards to safety, adequate employee facilities and to material handling methods to benefit the employee.

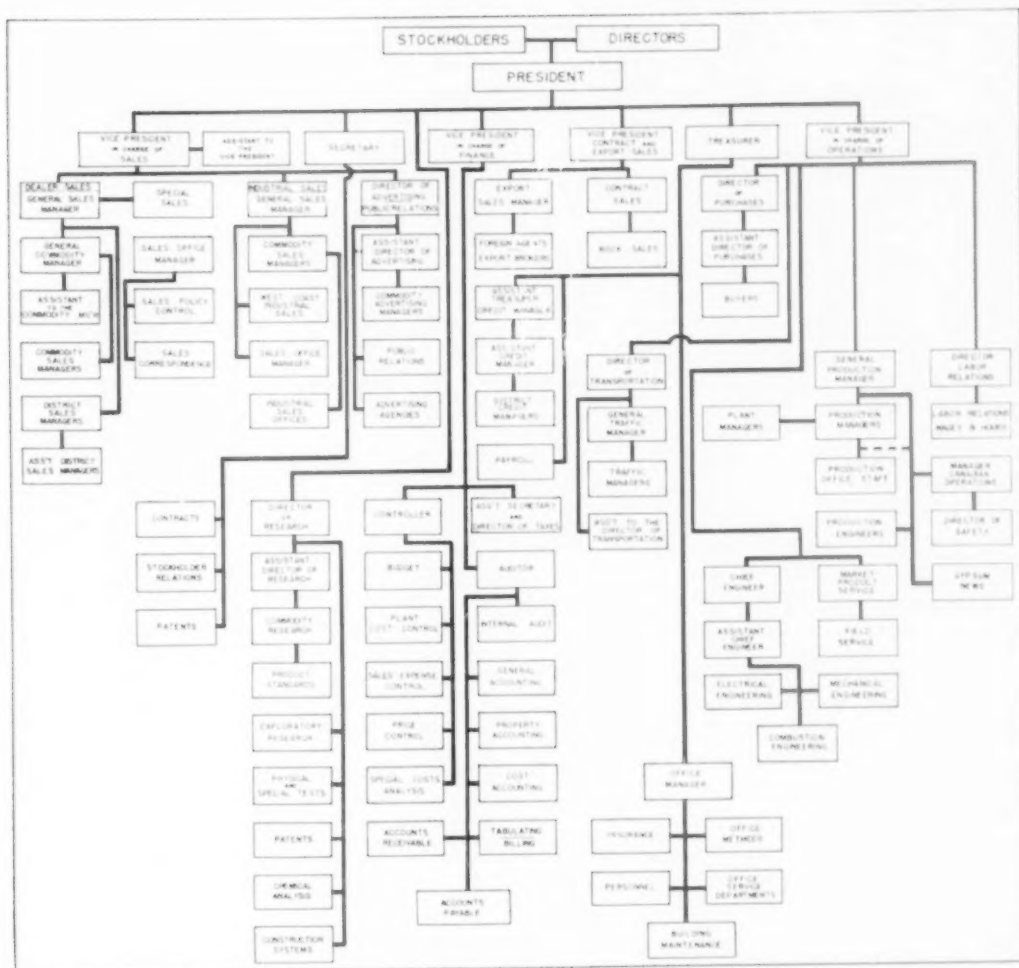
Emphasis continues to be toward the removal of bottlenecks to peak production. Capacity of the papermills is on the increase and ultimately will satisfy the company's requirements of 125,000 tons a year for board liner. The company does not intend to be subject, as it has in the past, to shortages, variations in quality and fluctuations in price. Capacity for delivery of gypsum rock from Nova Scotia is to be stepped up. Also, through manufacture of resins and retarders, the company expects to become self-sufficient and thus lower costs for those materials. The development of adequate reserves of rock deposits has kept pace with growth and the company has reserves sufficient to provide 100 years of operation.

A separate group of articles in this issue, devoted to plant operations, will describe production facilities, postwar developments in the plants and new and exclusive methods introduced by the company in the manufacture of its products.

Further expansion is contemplated but hinges, as all enlargement has, on the abilities of qualified personnel to take on the added responsibilities and on the capacity for sales. Fundamental policy with respect to expansion is expressed by an oft-repeated statement by Mr. Baker, who says, "This business can be no larger than the capacity of the dealers we supply. All our policies have to be based on good faith. That's how we can make dealers interested in our products. That's how we can insure our future growth and success." In line with that thinking a long contemplated expansion on the West Coast has been set aside temporarily. The company has acquired gypsum deposits in the Imperial Valley of California which are held in abeyance. It also contemplates expansion into Canada and, as this is written, is expanding facilities at Medicine Lodge, Kan., for the manufacture of gypsum wallboard and plaster.

Dealer Policies

The goal is to fit the requirements of dealers and to develop a network



National Gypsum Co. organizational chart

of production facilities close enough to markets to render quick service at the lowest possible cost. It is emphasized throughout the organization that the customer is the real boss of the business upon whom depends the success of the company and job security. Currently the company is investing approximately one-half million dollars at each of three of its gypsum plants in warehouses in order better to serve its customers in recognition of their desires for availability of a complete line of manufactured and warehoused products in straight, mixed, pooled or stop-over cars and in any quantities. These installations along with forklift trucks and other handling devices are being made in order to render the utmost in service to dealers who must be served promptly in order to maintain their own efficiency and who expect products to arrive on time. It

good condition and properly loaded for ease in handling at destination.

National Gypsum Co. has always sought to reduce costs through volume production and efficiency in order to strengthen and broaden future markets even in times when higher prices could be had.

Its record insofar as prices are concerned has been noteworthy during the past decade when many industries and companies have followed the practice of charging all that the traffic could bear. Whereas the prices for building materials in general had increased 110 percent through the 1939-1949 period, the products of National Gypsum Co. increased only 36 percent. During that period, wages of the company had increased 101 percent, freight charges had gone up 72 percent and cost increases for fuels and other necessary supplies had increased in the range of 69 percent.

128 percent. That prices could be held to a 36 percent increase is due to the practice of installing new equipment and improved methods, enabling higher volume production and efficiency.

Research

Introduction of new products, resulting from research, is undertaken only after demands for existing ones are satisfied, but the investment of funds in developing new ideas is a continuing process for the future welfare of the company and for job security. Research rates top priority with management and is responsible for the development of new products, the perfection of products, the preparation of process and performance specifications, control of uniformity of product, raw material analyses and is actively engaged in the establishment of plant operating practices and

in quality control. The staff consists of 25 engineers, chemists, physicists and metallurgists.

Research during the war had created a wider use of Gold Bond products in industry and had found new uses with the result that the sales of the Industrial Sales Division could grow to the point where they comprise 20 percent of total company sales. Gypsum plaster molds, developed during the war, for example, have been adapted to peacetime use; lime and limestone products are being shipped in increasing quantities for the manufacture of rubber, pottery, glass, steel, soaps and other products; and rock wool has found ready demand for the insulation of stoves, refrigerators and frozen food lockers.

Among the achievements of research have been:

In Gypsum

Lighter and stronger wallboard, gypsum lath and sheathing board.

Wood-grained surfaces on wallboard.

Metal foil on gypsum board for insulation.

Tiled surface wallboard for use in bathroom walls and kitchens.

Crackless cement combined with perforated fiber tape for covering wallboard joints.

In Rock Wool

A process for reducing cost by reclaiming waste heat from cupolas to provide steam for blowing wool.

A new blanket for providing low cost house insulation.

A method for making sound-absorbing pads.

Process for a new fireproof ceiling tile for acoustical control.

In Lime

White filler required in many industrial processes.

Purity and fineness necessary for use in making crystal glass and plastics.

Other major accomplishments have been in the fields of metal lath and fiber-insulation board.

Sales and Management

In all its expansion plans and its policies, the company has been mindful that the day would come when production would exceed demand for its products and has prepared for it. It has kept intact the goodwill of its dealers through the war and has continued to maintain that goodwill by emphasizing its dealer policies and through rebuilding its own sales organization. Advertising in the *Saturday Evening Post* with an audience of 4,000,000, and in other media, has been accelerated during recent years when demand has far exceeded supply, as a guarantee of future sales.

The sales training program has been expanded through the postwar years even when there was no need for any selling at all in order to move

the products of the plants. Training has been directed toward developing skilled building specialists, rather than just salesmen, who can really help the dealers, applicators, architects, contractors and tradesmen.

Each year some 25 college graduates are selected and trained to assure a steady supply of young men to take over managerial responsibilities in the future. Each plant and sales district has administrative personnel to expedite flow of materials and orders, and to correlate the various functions to keep all activities going at top peak of efficiency.

With respect to labor, the company's record stems from sound policy and a very real interest in the worker. Existing wage scales are being met in all communities where there are plants. A pension plan has been provided to pay \$100 per month upon retirement plan for death and providing payments for disability, illness and off-the-job accidents is optional to employees, with the company paying half the premium. Top company officials, including Mr. Baker, make it a point to visit the plants and to participate in the various community activities sponsored. Employees are kept informed of the company's progress through the "National Gypsum News," a newsy, well-edited magazine published bi-monthly in Buffalo. While the company has grown into a large organization, it is obvious that it recognizes the human relationships in business and it is evident that its business will never grow so large that the human side can ever be overlooked. The company has even gone so far in recognition of the individual that a program of human relations was started shortly after the war, to train supervisors to visualize and understand the problems of the individual in order to effect the best in working relations.

The development of men is considered as more important than all the other factors that contribute to growth of the company. From the start, it was recognized that men had to be found to create products and methods, to design equipment and plants and to train workers to operate them and provide the incentive to develop their talents. All of the company officers have been trained in the industry and in the company and were promoted to their posts from secondary positions within the organization. Officials who will take over top management in the near future will come from the department heads and those who manage the plants and district sales offices.

Officers

Officers of National Gypsum Co. are Melvin H. Baker, president; John C. Rest, vice-president in charge of foreign and special industrial sales; Dean D. Crandell, vice-president in charge of sales; Charles E. Masters, vice-president of finance; Lewis R.

Sanderson, vice-president in charge of operations; Walter S. Currie, treasurer; William M. North, secretary; Richard H. Means, controller; Roy Lund, assistant treasurer; Bayard L. Wooten, assistant secretary.

The board of directors, in addition to Messrs. Baker, Crandell, Sanderson and Masters, includes William M. Currie, president, Currie Products, Ltd., Hamilton, Ont., Canada; Elmer E. Finck, Finck and Huber, Buffalo, N. Y.; Edwin F. Guth, Edwin F. Guth Co., St. Louis, Mo.; Lewis G. Harriman, Manufacturers and Traders Trust Co., Buffalo, N. Y.; and A. W. Iglehart, W. E. Hutton & Co., New York, N. Y.

Fred Manske is general production manager; John Brown, general sales manager; Fred Wagner, auditor; and Frank Marsh, director of research.

Plants - Sales Offices

District sales offices and their respective managers are as follows:

Atlanta, Ga.—W. H. Pulley
Birmingham, Ala.—T. R. Avant
Boston, Mass.—C. A. Stengle
Buffalo, N. Y.—H. J. Burley
Chicago, Ill.—D. G. Stenberg
Cincinnati, Ohio—W. J. Stroud
Cleveland, Ohio—H. C. Shellhouse
Dallas, Texas—G. Gustavus
Detroit, Mich.—J. L. Phillips
Kansas City, Mo.—J. N. Williams
Houston, Texas—D. B. Bobbitt
Minneapolis, Minn.—H. R. Little
New York, N. Y.—M. F. Cerruti
Philadelphia, Penn.—E. M. Andrews
Pittsburgh, Penn.—W. M. Ritchey
St. Louis, Mo.—R. A. Pence
Washington, D. C.—J. P. Nicely
West Coast—W. H. L. Mills

The plants and their managers are as follows:

Akron, N. Y. (gypsum)—L. S. Moore
Alexandria, Ind. (rock wool)—G. K. Willis
Baltimore, Md. (gypsum)—C. E. Anderson
Bellefonte, Penn. (lime)—N. E. Gustafson
Clarence Center, N. Y. (gypsum)—L. H. Seufert
Dover, N. J. (rock wool)—R. L. Kilgore
Fort Dodge, Iowa (gypsum)—H. J. Marsham
Garwood, N. J. (paper)—L. Tabelman
Kalamazoo, Mich. (paper)—F. Buchanan
Kimballton, Va. (lime)—M. Rule
Lucy, Ohio (lime)—F. C. Malley
Mansfield, Mass. (rock wool)—Gordon Wilkins
Medicine Lodge, Kan. (gypsum)—D. C. Chads
Mobile, Ala. (fiber-insulation board)—Colon Brown
National City, Mich. (gypsum)—K. W. Waugh
Newburgh, N. Y. (paper)—W. T. Caba

New York, N. Y. (gypsum)—C. J. Taylor
 Niles, Ohio (metal lath)—J. J. Manofsky
 Portsmouth, N. H. (gypsum)—F. D. Crowley
 Rotan, Texas (gypsum)—J. E. Irvin
 Savannah, Ga. (gypsum)—J. J. Burns
 York, Penn. (lime)—W. W. Wallace

Products

Products of the company include the following:

General Building Products

PANEL BOARDS

Gypsum & alabaster
 Gypsum tile board
 Gypsum grain board
 Gypsum sheathing
 Hardboard
 Fiber insulation board

JOINT SYSTEMS

Perforated tape joint system
 Joint finisher

LATH

Gypsum lath
 Metal lath

METAL LATH PRODUCTS

Metal lath
 Cornicette
 Stripite
 Corner bead
 Arch bead
 Base bead
 Picture moulding
 Cold rolled channels
 Hot rolled channels
 Penell Rods
 Galvanized tie wire
 Channel clips
 Lath clips
 Metal arches
 Steel basement sash
 Steel coal doors
 2-in. Solid partition system
 Hollow wall partition system

INSULATION

Fiber insulation board
 Fiber insulation tile
 Fiber insulation sheathing
 Rock wool batts
 Loose rock wool
 Granulated rock wool

BASE PLASTERS

Fibered-Unfibered
 Wood fibered
 Sanded fibered
 Sanded wood fibered
 Bond plaster
 Portland cement & fiber fibered or unfibered

FINISH PLASTERS

Smooth trowel No. 1 (White)
MOULDING AND GAUGING
 Super white moulding
 Sapphire moulding
 Super white gauging
 Sapphire gauging
 Keene's cement

MISCELLANEOUS GYPSUM PRODUCTS

Roof composition (Metro Mix)
 Plaster of Paris
 Patching plaster
 Mixing plant stucco

HYDRATED LIME

Finish
 Mason's

SOUND CONTROL

Acoustic plaster
 Acoustifiber tile
 Econoacoustic fiber tile
 Acoustimetal
 Acoustics
 Sprayed "Limpet" asbestos

PAINT PRODUCTS

Casein paint
 Resin-emulsion paint
 Tinting colors
 Aluminum paint
 Exterior cement paint
 Patching plaster
 Sparkling compound
 Textures

Industrial Products

INSULATION

Rock wool felt
 Rock wool insulating cement
 Granulated rock wool
 Loose rock wool
 Fiber insulation board

INDUSTRIAL GYPSUM

Metal casting plaster
 Gypsum rock
 Calcium sulfate
 Terra Alba
 Anhydrite
 Polishing stucco
 Plate glass stucco
 Land plaster
 Orthopedic plaster
 Dental plasters
 Impression
 Laboratory
 Casting
 Terra cotta stucco
 Insulation brick stucco
 Safe cabinet stucco
 Plaster of Paris
 Pottery plaster

Paper filler
 Pattern plaster
 Kalsok

GROUND LIME

Chemical
 Agricultural

PULVERIZED LIME

Chemical
 Agricultural

HYDRATED LIME

Chemical
 Agricultural

LUMP & PEBBLE LIME

Chemical
 Agricultural

LIMESTONE

Crushed stone
 Ground stone for

AGRICULTURE

Patting
 Mine dusting

GLASS

Glass filler
 Rubber
 Paint
 Linoleum

PULVERIZED CALCIUM CARBONATE

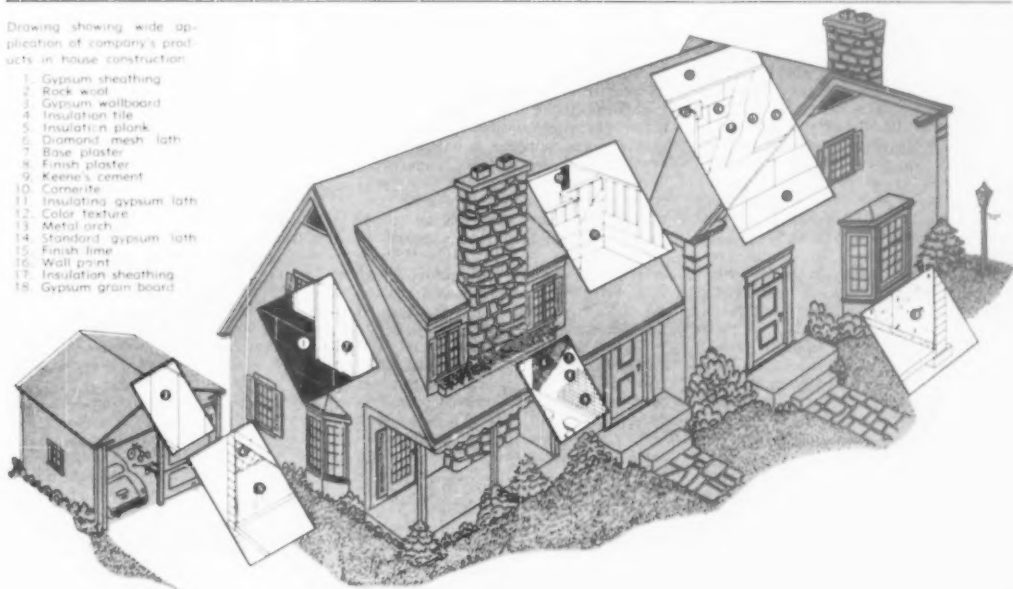
for general industrial uses and pigments

Conclusion

The editors wish to acknowledge their indebtedness to Mr. Baker, department heads and the entire National Gypsum Co. organization for the privilege of interviews and unrestricted research into the company's files in Buffalo which made it possible to present these articles. We also thank the authors of feature articles, requested in connection with this issue, for taking valuable time from their busy schedules to present in detail phases of the company operations that deserve careful study by our readers. In closing this lead article, we specially thank public relations manager David White, Jr., for his invaluable assistance in the accumulation of necessary facts and illustrations.

Drawing showing wide application of company's products in house construction

1. Gypsum sheathing
2. Rock wool
3. Gypsum wallboard
4. Insulation tile
5. Insulation plank
6. Diamond mesh lath
7. Base plaster
8. Finish plaster
9. Keene's cement
10. Cornicette
11. Insulating gypsum lath
12. Color texture
13. Metal arch
14. Standard gypsum lath
15. Finish lime
16. Wall print
17. Insulation sheathing
18. Gypsum grain board



RESEARCH—

THE KEY TO DIVERSIFICATION

Quality control at plants, development of new processes and writing of specifications, among responsibilities of research department, under direct supervision of president

By FRANK L. MARSH



Frank L. Marsh, director of research

A SHORT WHILE AGO, M. H. Baker sent a memo down to us in research. "Every sign points to the fact that we soon will be in a highly competitive market," he said. "We want to be absolutely sure that we go into it with quality up. Make an immediate, simultaneous, comprehensive recheck on the quality of all products at all plants."

There are over 150 Gold Bond products being produced in 23 plants from Canada to the Gulf. A quality survey of our whole line and of all plants, such as President Baker ordered in his memo, would be a pretty big undertaking—except for one thing. The research division was organized to do it, thoroughly and in a hurry.

At another time, our sales management needed to know just exactly how our wallboard compared with competitive products then on the market. Over night, orders went out to over 125 salesmen in all parts of the country and by the next noon each one of these men had shipped us one random panel of gypsum wallboard of competitive make and one panel of our own manufacture purchased in the open market. The average cost of getting those boards to our central laboratory was \$824, or better than \$250 per thousand square feet. That's pretty expensive wallboard but what we found out was well worth the cost.

As soon as these sample panels started arriving, six research men began inspecting, measuring, cutting and testing in accordance with a definite, pre-arranged plan. As a result, within days of the original order from the sales department, we reported what competition was selling in every district in the country and how it compared with our product as it was being sold in the same market. Again, the research division did the job because it was organized to do it, thoroughly and in a hurry.

In short, the research division is organized to act as the eyes and ears of management, proving, checking, searching, and all the time constantly guarding the quality of Gold Bond products. We stand as the company's self-imposed, quality watchdogs. At the same time, we are the advance guard in the development of new products and processes.

Laboratory Facilities

At the present time, our research division has a staff of 25 qualified research engineers. Since August of this year, we have been engaged in a decentralization of our efforts in the interests of greater efficiency. Until that time, it had been our practice to concentrate our staff in our central laboratory at Clarence Center, N. Y. Here, research activities relating to all products were centralized and staff members visited the plants only to make periodic quality audits or to tackle some specific problem as it arose. This method of operation proved successful enough over the years. However, as our problems multiplied after the war and as it became more and more necessary to move speedily to meet or anticipate competitive activity, it became clear that we must have specialized laboratories, each dealing with specific product groups.

Today, research facilities are in operation at six of our plants. At Clarence Center, we work on gypsum products, including joint cement, textures, and finish lime. At Bellefonte, Penn., we specialize in high calcium lime research. All of our rock wool studies are carried out at our Alexandria, Ind., plant and we concentrate our insulation board research at Mobile, Ala. At New York City, we have set up a paint laboratory, and all of our important investigations on paper are centered

at Kalamazoo, Mich. Finally, at Clarence Center we have added two sections to handle process research and the study of construction systems. Each of these laboratories is completely equipped and is independent of the quality control set-up already in operation at these plants.

Each of these sections is headed by a research supervisor who is assisted by a staff of research engineers. This team is responsible for the preparation of new and revised specifications for products, processes, raw materials and test methods. They also make semi-annual quality audits of all plants within the scope of their activities and periodic organized evaluations of competitive products. Finally, they are responsible for the development of new products and processes in their field.

As a result of this decentralization, we now can offer management specialized research under the most favorable conditions. For example, at our lime plant at Bellefonte, our research supervisor and his staff are studying the problems of that industry at one of the most modern high calcium plants in the world. They live and work with production men who have had years of experience in lime processing. They operate in the vicinity of a great industrial area where lime is used in hundreds of different ways in the manufacture of hundreds of different products. In other words, our lime research team works in an atmosphere tailor-made for lime research.

Specifications

The first, never-ending part of the research job in National Gypsum is quality, and the key to it is the specification. According to company policy, Gold Bond quality will be equal to or superior to that of major competition. It is research's responsibility to set

RESEARCH

standards that will assure high quality and then to check to determine that those standards have been met.

In the first place, then, we prepare written specifications that will result in maintaining top quality. These specifications are based on exhaustive tests of our own and competitive products and they cover products, processes, raw materials, and test methods. They are issued to all plant managers concerned and their purpose is to set down the standards by which raw materials and products must be judged and to explain procedures and test methods. Obviously, our specifications are not to be considered as instruction sheets on how to run a plant. They are not substitutes for training and practical experience. Plant managers use them as specifications of objectives to be reached, as measuring rods by which they must determine whether or not their finished product is suitable for shipment.

The research division also prepares a second set of specifications for use by the sales department. This set outlines the proper use and application of the finished product and clearly sets forth performance standards that our products will meet if used as prescribed.

We cannot, of course, be satisfied with simply writing standards for our production people to meet. An important part of our job is to run impartial studies of their output to determine whether or not these standards are being met. Actually, these studies are going on all the time. Therefore, when President Baker calls for a special quality audit to check on our ability to enter a competitive market, research can come up with the answers in a hurry.

Quality Controls

Serving as the starting point for all of our quality studies and audits

is a daily report that keeps the plant manager, production officials, and the research division up to date on quality trends. Made up of a series of carefully worked out "yes or no" questions, this report is quickly prepared by the quality supervisor at every plant. It covers every phase of the quality problem—raw materials, manufacturing processes, finished products, shipped products, adequacy of specifications, and complaints. Finally, it gives the quality supervisor a chance to call for assistance when he needs it.

By a quick study of these daily reports, all of us concerned with maintaining the standards for our products can tell at a glance whether production is running smoothly or whether danger spots are developing that call for action. Without plowing through a lot of figures and other data, we can get a direct answer to the question "How good is our product today?" Summarized weekly, these reports provide the basis for the regular reports on quality which are presented directly to the president.

Following up on the trends, indicated by the daily reports, research personnel may be called upon to carry on a special survey in any plant. In addition, regularly every six months, a full quality audit is made at each plant as a service to management and to production officials.

Special Activities

In addition to working closely with production management on quality problems, research cooperates too with the sales organization. At regular meetings with top sales executives, research is briefed on product needs. Sales proposes new products or improvements in existing products that may be required to maintain our competitive position or to meet the needs of a certain market. These proposals

are presented as formal requests for action by research and they are placed on our agenda according to priorities assigned by the selling organization.

From time to time, sales management also may call on the research division to furnish specialists to investigate problems beyond the scope of regularly assigned market supervisors. Finally, the sales department is expected to advise our division of any product or construction system that it is going to propose so that a preliminary patent search can be made before any action is taken.

Departmental Cooperation

In the performance of all of these principal functions, the research division, of course, must work closely with other departments in the organization. For example, we get together regularly with the controller since the adequacy of the specifications we prepare for production directly affects costs and cost control. Conversely, we study the controller's records for clues to deviations from specified practices in the plants. Again, we cooperate with the advertising department in preparing the wording of advertisements describing our products and the claims we make for them.

All of this activity on the part of the research division is carried on under the direct supervision of the president of the company. We report to him informally every week, in writing every month, and in a detailed analysis of National Gypsum's status quality-wise and with a step-by-step report on the development of new and improved products. As a result, he has independent, up-to-date technical information at hand when he is ready to lead his management team in preparing to meet competition and to get National's share of the building materials market.



A typical plant chemical control laboratory, this one at Rotan, Texas



All gypsum research activities of the company are centered at this laboratory at Clarence Center, N. Y.

PLANT OPERATIONS GEARED FOR LOWERED UNIT COST

Company operates ten gypsum plants, four lime plants and three rock wool plants; produces more than 150 products from a total of 23 plants

ALL OF NATIONAL GYPSUM CO.'S plants are modern, high capacity operations and are representative of a broad line of products of the rock products industries, as itemized in the lead article covering the scope of the company's overall activities. In the articles that follow, each of the gypsum and lime plants and the rock wool operations are considered, not in detail because of space limitations, but with emphasis on special features and recent improvements and enlargements.

The Clarence Center, N. Y., plant is described in detail, having recently been completely rebuilt and because it is representative of more or less standard practice in the gypsum plant operations including the new Baltimore plant.

The company operates both underground gypsum and limestone mines and quarries, with standardization in practice and with respect to exploration and core drilling. Methods of mining and quarrying are considered in a special article in this issue with emphasis on new practices such as diamond drilling in limestone mining which the company helped pioneer. A second special article is on transportation in all its phases with special emphasis on warehousing and palletized handling at its various gypsum plants—that being a new trend of particular significance.

As has already been stated, the gypsum operations have become more or less standardized. One recent trend in these plants has been the stepping up of production line speeds for greater output and conversion of board line drives to d.c. power for instantaneous starting and stopping. Equipment in these plants has also been standardized, by type and manufacture, as touched upon in our consideration of the gypsum operations.

In underground operations, both in gypsum and limestone, the trend is toward the Joy loader operation and, in open quarries, there has been standardization in recent years on high shovel-capacity trucks. Most of the rock handled is of soft characteristics and it appears that crushers of the Pennsylvania single-roll toothed type predominate, etc., etc.

Standardization applies to drives, conveyors and electrical equipment where there are obvious advantages to dealing with a single manufacturer when possible. For example, standardization is on General Electric electric equipment, Link-Belt belt conveyor idlers, Falk small gear reducers, and large Link-Belt, Jones and Winfield-Scott gear reducers.

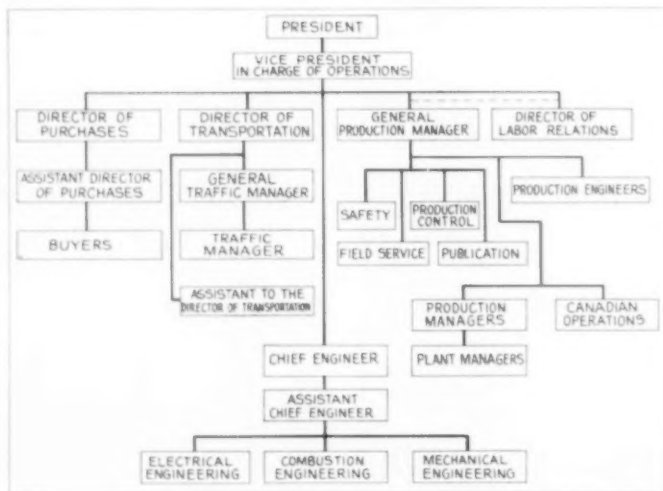
Most of the major equipment is specified by the engineering and op-

erating departments which are adequately staffed to design all plant modernization, additions and new plants. The purchasing department buys manufacturing materials—parts, supplies, etc., for the various plants and functions with the plant managers in following their recommendations where special requests are made for preferential purchases. Except in special cases, like where shortages exist, and local sources might be available, purchases are made through the Buffalo office. Each plant has administration personnel to keep the flow of materials and supplies coming as needed and also to expedite the movement of finished products from the plants.

Each plant has a quality supervisor and staff who test and help to control quality, all under the plant manager.

An incentive program is in effect at each plant, for the benefit of plant supervisors, based on quotas and a system of scoring that covers, not production alone, but quality, safety, employee relations, good housekeeping, relations with the local community,

The articles on production, transportation, and quarrying and mining practices were written by the editorial staff of Rock Products through visits to certain of the key plants and through interviews with National Gypsum's production men in Buffalo.



Organizational chart for plant production



Fred A. Manske, general production manager



S. D. Skinner, chief engineer



Donald E. Eilertsen, mining engineer



E. B. Hollingsworth, production manager



Eugene W. Odenwaldt, production manager (rock wool)



Richard E. Gill, production engineer (lime)

etc. Each count is weighed and, based on the accumulative score, cash bonuses are paid.

Managers of all the plants come to Buffalo for an annual meeting to consider new plans and to learn of sales objectives and to exchange ideas. Fred Manske is general production manager with headquarters in Buffalo, and E. B. Hollingsworth, Eugene W. Odenwaldt, and Leonard L. Hank are

production managers. S. D. Skinner is chief engineer. In addition, the production staff includes trained specialists who visit the various plant operations where their services are required. D. E. Eilertsen is mining engineer, and A. T. Kohorst, C. L. Saxe, and R. E. Gill are production engineers. P. H. Fretthold is production control manager. The organization chart is shown herewith.

cally replaced wood lath. Gypsum rock is also used as a retarder in the manufacture of portland cement.

Keene's Cement is a high-temperature gypsum product and as such is practically completely dehydrated. To it are added certain chemicals that cause it to set with high strengths and pleasing finishes so that it finds many uses for decorative purposes and other higher types of artistic structural work.

Gypsum today is the most important structural material that is used for home construction. As our lumber resources decline its inherent qualities can be used to replace many of the items now pre-empted by the lumber manufacturers. It ranks ahead of steel and concrete for this type of construction. Whenever you see a home, apartment, office building—and many industrial buildings, it's almost a foregone conclusion that all interior plastering from the scratch coat to the finish coat will be essentially a gypsum product. Wallboard and gypsum lath are equally important and gypsum sheathing is in the offing to replace lumber sheathing.

It makes a white hard wall, fire-proof, verminproof, has excellent sound insulating properties and is easy to apply and sets at most any predetermined time to make a hard

GYPSUM OPERATIONS

GYPSUM IS A ROCK of sedimentary origin and is usually considered to be a precipitated product that forms when saline waters reach a certain concentration. Fresh water from a river having calcium sulfate in solution is thought also to have precipitated its load when these waters reached a salt lake or sea. It is not an uncommon mineral and often deposits of great size have been built up over eons of time.

Gypsum is calcium sulfate and has the chemical formula $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. Commercial deposits are of varying purity but it is not uncommon to find great beds that will be 99 percent (plus) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. The color ranges from pure white to various degrees of

gray. Whiteness implies purity but some low grade materials can be white. The real test is the chemical analysis.

When the finely ground crude rock is heated to modest temperatures some water is liberated. For commercial work, when the mass has been heated and the water reduced to approximately 25 percent of its original content, or, to correspond to the general formula of $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$, that product is referred to as "stucco" or plaster of paris. Stucco is the basis of practically all plasters from dental to fibered hardwall, casting, finishing, etc., and stucco is likewise the basis of all gypsum wallboards and gypsum lath. The latter has practi-

and smooth wall of pleasing appearance. New applications and uses for the material grow from day to day. One use that has grown in the last few years is that of gypsum plaster (fiberglass hardwall) intermixed with expanded perlite to make a lightweight and structurally sound wall. Gypsum has replaced lime as an interior wall forming material, practically absorbing that use entirely.

Gypsite, one of the raw materials for plaster at Rotan, Texas, is similar in composition to gypsum but is an earthy material and has not been consolidated into a rock like gypsum has. Anhydrite is a natural calcium sulfate mineral without water (CaSO_4). Gypsite deposits are easy to mine as no blasting is required, but surface deposits of high quality are rare because of wind-borne impurities.

The National Gypsum Co. in all its deposits has a basic raw material that equals or is better than average. Its Best Bros. Keene's Cement is recognized as tops with little material competing with it. The processing techniques further improve the quality of the raw materials as is illustrated by the fact that all rock for the waterborne plants on the Atlantic coast is washed as a part of the processing to remove any foreign adhering impurities.

National Gypsum Co. has ten gypsum processing operations and all include calcining. By the summer of 1951, all ten plants will have wallboard and gypsum lath manufacturing equipment of the latest design. All are geared to a progressive and constant goal of a better product at reduced cost.

The ten gypsum processing and wallboard plants can be divided into two groups. Group No. 1 includes the four plants on the Atlantic Coast all of which receive their raw materials from three quarries in Nova Scotia. The plants are located at Portsmouth, N. H.; the Bronx, New York City; Baltimore, Md., and Savannah, Ga. The Baltimore plant is the newest addition to the Coastal group but the Savannah plant, while older, has had

so many major additions and replacements since the close of World War II, that the plant is practically a new one. The Bronx and Portsmouth plants likewise have been brought up to the high standards set by the operating and engineering staff.

As the transportation of crude gypsum to these ports must cease during the hard winters of Nova Scotia, all coastal plants feature large storage facilities for the crude rock. Minus 5-in. rock is usually shipped. Both inside and outside storage are in use. The extent of shipment of the finished materials by truck varies from plant to plant but the Bronx unit ships practically all its output by truck.

The quarries in Nova Scotia are called the Dingwall, Cheticamp and Walton quarries. All are open-quarry operations using modern techniques for stripping and quarrying the crude material. To insure a crude material that is of the highest purity, all the rock is trucked to a washing plant at the harbor before loading by belt conveyor into cargo ships owned and operated by the company. The company has three ships of 10,000 tons capacity each, named after the quarries, i.e., the "Dingwall," "Cheticamp" and the "Walton." These ships haul gypsum rock from June 1 to about November 15. The balance of the year they are used as common carriers in international and coastal trade.

The second group of plants consists of inland operations which are located near gypsum deposits of high purity and close to the larger population centers of the United States. All the deposits including Nova Scotia are large and have sufficient gypsum ore reserves to run the plants for a hundred years or more. The most western plants are at Rotan, Texas, and Medicine Lodge, Kan. The other gypsum plants are Fort Dodge, Iowa; National City, Mich.; Clarence Center and Akron, N. Y. The Clarence Center and Medicine Lodge operations secure their gypsum rock from underground mining operations. With the exception of the Akron, N. Y., plant, the others are open-quarry op-

erations. Rock for the Akron plant is shipped from Clarence Center, mostly by truck over a haul of about 12 miles. The deposit at this location was exhausted a few years ago. All the plants are geared to a full-speed, 24-hr. day production schedule, operating six or seven days per week.

For production of stucco for the plaster trade, and for the wallboard and gypsum lath, conventional calcining kettles are used in all the plants with the exception of the Akron and Medicine Lodge operations where rotary kilns are used. Kettles can produce a uniformly high quality product at a low fuel consumption with nominal attention. Rotary kilns likewise can produce similar stuccos as regards quality and productivity, but they require closer attention.

All the plants are subjected to constant study aimed at more efficient operation. When a wallboard machine has been successfully speeded up, then all related operations from the mine onward likewise have had their production cycles pushed upward. However, product quality is never sacrificed. Safety, personnel, transportation, sales and plant housekeeping are of the highest order.

The gypsum and wallboard-lath plants are all of large capacity and, because of the decided trend toward a greater number of products and more diversified line of construction items that are allied to plastering material, wallboard and lath, additional warehouse space is now being added to practically all plants. These warehouses are designed with an eye to both truck and rail transportation with the former method growing in importance. At times 40 or more items will go out in one carload, so facilities for rapid and efficient car loading are required to keep pace with the warehouse construction program. This means, for instance and in one detail, that forked lift trucks for pallet loading and unloading will be used to an increasingly large degree. The Bronx operation, for example, has 15 or 20 lift trucks in sizes to handle from 3000 lb. to 5 tons.



"Dingwall" loading gypsum rock



Loading dock of the Dingwall, Nova Scotia, quarry

Plant Managers



Dudley C. Chads
Medicine Lodge, Kan.



John J. Burns
Savannah, Ga.



C. E. Anderson
Baltimore, Md.



C. J. Taylor
New York, N. Y.



Frank D. Crowley
Portsmouth, N. H.



Robert L. Kilgore
Dover, N. J.



Louis M. Seufert
Clarence Center, N. Y.



Harold E. Gustafson
Bellefonte, Penn.



George K. Willis
Alexandria, Va.



Gordon Wilkins
Mansfield, Mass.



William W. Wallace
York, Penn.



Homer J. Marston
Ft. Dodge, Iowa



Keith W. Wough
National City, Mich.



John E. Irvin
Rotan, Texas



Monroe Rulo
Kimballton, Va.



Fritz C. Mallory
Lucky, Ohio

CLARENCE CENTER GYPSUM PLANT

By WALTER B. LENHART

THE CLARENCE CENTER PLANT was the first plant of National Gypsum Co., and has been replaced recently with the ultra-modern and large capacity plant described herein. The first year, the plant shipped about \$400,000 worth of gypsum products and by contrast, since it was rebuilt it is now considered to be the largest gypsum processing plant of the company and one of the largest producers in the world.

Clarence Center is about 10 miles northeast of Buffalo, N. Y. The immediate area is flat with the surface intensively farmed. One is a little bit surprised to learn that great land areas adjacent to Clarence Center are underlain with a flat, almost continuous bed of gypsum rock of exceptional purity. As a matter of interest, the headquarters of the company in Buffalo is on property underlain with gypsum rock. The gypsum bed varies in thickness from $3\frac{1}{2}$ to $4\frac{1}{2}$ ft. and the beds are interposed between horizontal strata of limestone. The ore requirements are such for the Clarence Center operation that over one acre of ground is mined out per week and this means that underground transportation each year extends farther and farther from the shaft. The ore is mined using the "Room and Pillar" system of mining and retreating is not practiced. The ground stands well and no attempts are made to back-fill, though wooden props are used to support the roof. In some sections of the mine 6 in. to a foot of the backs (roof) are scaled off for reasons of safety, and to provide more head room for the miners. The shaft serving the operation reaches the gypsum beds at a 60-ft. depth so with this shallow depth several mine innovations are practiced. First, there is no man-way in the accepted sense of the term; one simply walks down a series of steps that resemble interior hotel fire escapes to reach the bottom. Secondly, there is no skip or hoist as the mine-run rock is crushed underground and elevated to the surface in a large-capacity bucket elevator. Some water is encountered in the mine and this is pumped to the surface as required.

Mining and Stockpiling

Mining the narrow band of gypsum starts with the drilling of the ore by air-driven augers, with enough headings being worked to supply needs—usually at least three headings. The powder used is normally "Gysal A" supplied by the American Cyanamid Co. Temporary wood stulls are often used at the headings to protect the miners from rock falls resulting from spalls. All underground workers are

required to wear suitable hard hats for head protection. Electric battery-powered head lights are featured for the mining crew.

Loading of the broken rock at the face is by one of three No. 14-TBE mechanical loaders manufactured by the Joy Manufacturing Co. These rugged machines are built and designed for working in rooms of low heads and their use has made it possible to load up to 1800 tons per day. The mechanical loaders discharge to a fleet of six Joy 4-wheel shuttle cars. The shuttle cars ply back and forth from the loading face to the industrial mine track that is strategically located so as to reach the working parts of the mine and the toe of the shaft. The shuttles unload to 6-ton capacity bottom-dump mine cars. For haulage of these cars there are available two Westinghouse, one Goodman, and one General Electric mine locomotives.

Near the toe of the shaft the cars bottom dump to a car dump hopper that can deliver up to 200 t.p.h. It operates at 7 f.p.m. and delivers the mine rock to a 42- x 66-in. Flextooth Jeffrey crusher that reduces the stone to about minus 5-in. The crusher will easily handle 200 t.p.h. The crusher discharges to an inclined 24-in. belt and the rock on this belt is accurately and automatically weighed by a Merrick Weightometer. The crushed rock is then elevated from the discharge of the inclined belt by a Link-Belt bucket elevator that has a 41- x 78-in. steel casing.

The bucket elevator serving the mine can deliver to the boot of a second bucket elevator, or direct to a 24- x 60-in. Pennsylvania single-roll crusher that reduces the material down to about 2 in. A short 30-in. stub belt under the hammermill can deliver the crushed rock to the second bucket elevator previously mentioned. As far as stockpiling is concerned, this second bucket elevator dumps to a 24-in. belt conveyor that delivers the crushed rock to a tripper (the tripper has a 3-way chute) over the undercover storage facilities. The rock storage is 75 x 180 ft. and allows for 5000 tons of live storage. A flat-running reclaiming belt delivers to the second bucket elevator referred to above. This elevator has a 45 $\frac{1}{2}$ - x 66-in. casing. When the mine rock is not going to storage, or rock from the storage piles is being taken into the plant, the same bucket elevator can discharge to a 5- x 14-ft. double-deck, dry, Tyler Niagara screen, or, if desired, this screen can be by-passed. If crude gypsum is wanted for such markets as cement rock, it can be by-passed at this screening point and be sent

to a belt to the car loading facilities. However, if desired, all rock or intermediate sizes of rock can be sized over the Niagara screen. In case the screen is by-passed completely, the rock from storage can be sent directly to 200-ton capacity parabolic steel bins ahead of the 9- x 70-ft. Vulcan dryer. The dryer is coal-fired and has a capacity of 70 t.p.h. The unit is fired by a Skelly stocker supplied by the Combustion Engineering Co. To deliver the rock from the steel bin to the dryer, a flat running belt conveyor discharges to a 24-in. open top inclined carrier that serves the feed end of the Vulcan dryer. The dryer is fired from the high end and discharges to a short bucket elevator that serves a 36-in. Pennsylvania hammermill. Dust from the hammermill, and/or the dryer discharge, is controlled by means of a Buell dust collector and dust as collected is returned to the boot of the elevator that also eventually receives the hammermill product. In an emergency or if so desired the dryer can be by-passed, in which case the rock is chuted to the boot of the elevator that serves the dryer. This chute is rather flat so two heavy-duty Syntrol electric vibrators are fastened to the bottom of the chute to facilitate flow.

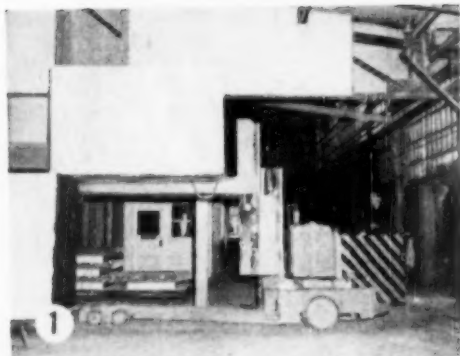
The last mentioned bucket elevator can discharge to a 14-ft. Raymond mechanical air separator, or the material is sent direct to one of three steel parabolic kettle feed bins that hold 100 tons each. In this phase of the transportation system screw conveyors are used. Most of these are in the 12- and 14-in. diameter range.

There are three Raymond mills for the finer grinding ahead of the kettles. Two of the mills are 5-roll low side and one is a 4-roll low side, and each is equipped with a Raymond cyclonic-type dust collector with filter bags on the vents. The Raymond mills and the Vulcan dryer are in the same room, and even with all the activity in this section of the plant dust is exceptionally well controlled and plant housekeeping is excellent. The cyclones are 8 ft. in diameter and the tubular bag collectors are 8 x 18 ft.

Calcining

The ground gypsum from the Raymond mills and that from the dust collectors is conveyed by screen conveyors to five individual steel kettle feed bins each holding 80 tons of ground gypsum. Feed to the kettles is controlled by short screw conveyors under the bins. There are five coal-fired kettles in operation. Three are provided with Skelly automatic stockers and the other two are to be similarly equipped. All are 10 ft. in diameter by 12 ft. high, and the newer ones have extension tops. Dust from the kettles is collected by Raymond collectors of special design.

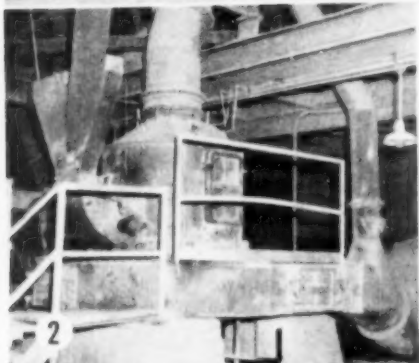
Coal for firing of the kettles is delivered over the New York Central railroad, and by means of track hop-



1



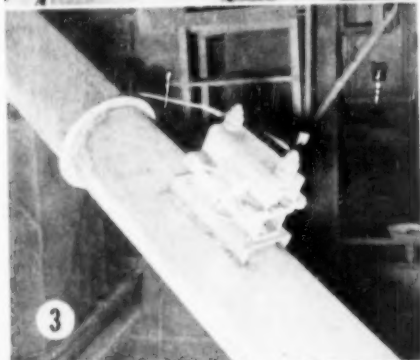
Loader of muck pile averages 1600 tons per day



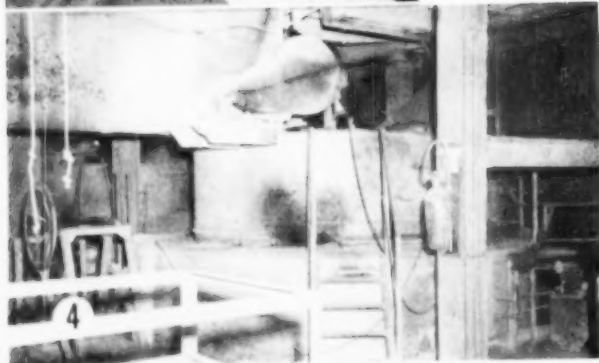
2



Shuttle car transfers its load to mine car



3



4

per, apron conveyor, bucket elevator and 14-in. screw conveyors, is delivered into a parabolic steel bunker holding 225 tons. Coal from this bin can be chuted direct to a 1-ton weigh larry that travels in front of and above the stokers so that no manual handling of the coal is required. Coal ash is disposed of from a bin served by a Beaumont-Birch ash skip hoist.

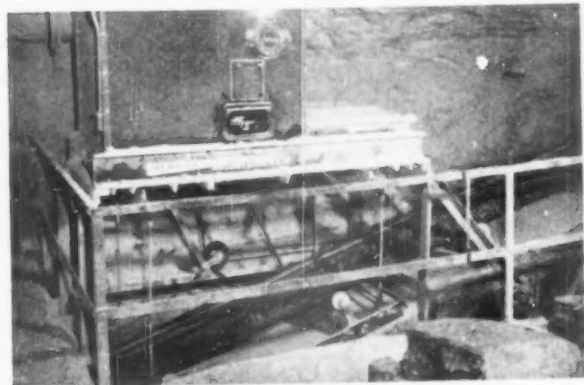
The kettle discharge gates on the two older kettles are of the conventional inclined slide-gate arrangement but the outlet gates on the three newer kettles are more in the nature of an elongated plug that intrudes (or recedes) into the opening in the kettle's bottom. Control of this gate is by means of a hand wheel and chain from atop the hot pit.

Each kettle discharges to its individual hot pit holding 20 tons and these pits are emptied by a drag chain assembly that serves two bucket elevators that deliver to a 14-in. screw conveyor. At the discharge end of this conveyor is a 4- x 5-ft. single-deck Ham-mer screen that removes any foreign materials that might have gotten into the stokers up to this point. From this point a rather elab-

- (1) Pictured here is a forked lift truck taking a pallet load of wallboard for loading to box cars, flat cars, or trucks. (2) One of the battery of roller mills that prepares the gypsum for calcination, land plaster, etc. (3) Electric vibrator on a gypsum by-pass chute near the dryer prevents material from sticking. (4) Extension top of one of the newer kettles; stucco is fed to the kettle by screw conveyor (upper left) that is under control of the calciner.



Loader discharges to shuttle car, maintaining high production



Automatic weighing machine on belt in mine

orate system of screw conveyors can deliver the stucco to the tube mill bins, to straight stucco bins or to bins serving the wallboard plant.

All stucco for the plaster trade (fibered and unfibered hardwall) is sent to two steel parabolic bins holding 200 tons each. These bins serve a 5- x 20-ft. Smidth tube mill and an Allis-Chalmers 6- x 22-ft. tube mill. These tube mills have capacities of six and ten tons per hour, respectively. All stucco for the previously mentioned plasters is tube-milled before sending it to the bins over the St. Regis packers. Recently work has been carried on with respect to the character of the ball load in the tube mills and it has been found that by using smaller steel balls and a graduated ball load (from 1 to 1½ in.) that the final product has greater plasticity and sand-carrying capacity.

Sand for the sand-plaster trade is delivered to the plant in cars and the material is stored on the ground. A clamshell rig in conjunction with a suitable bin feeds a hand-fired rotary sand dryer and the dried material is elevated to a 450-ton dry sand silo.

5: Weighing hopper over one of the bagging machines. 6: View of the device designed by the company that automatically turns the green board over before entering dryer. 7: Leveling machine in foreground at the take-off end of automatic wallboard machine sinks into floor to remain at constant level, then rises to permit fork truck loading. 8: The bagging machine is set at right angles to the loading track and close to the loading doors.



The sand from this silo is screened before reaching the sand storage bins over the mixers through an 18- x 48-in., double-deck Niagara screen and a coarse and a fine sand are placed in separate bins. Dust from the packers in this section of the mill is collected by Norblor dust collectors.

Mixer and sacking facilities are also available to manufacture a perlite-gypsum plaster. Perlite is received in paper bags and these are stored on the mixer floor. Perlite-gypsum plaster is a pure white, extremely lightweight material that is rapidly growing in acceptance over the country as a replacement for the older sand-gypsum product.

Wallboard Plant

The wallboard plant has been expanded and now has a longer belt, a faster belt and refinements in technique to give the best quality wallboard and lath. The present forming belt is 633 ft. 6 in. from the master roll to the knife, and high speed mixers are used for the stucco pulp and the additive pulps. At the end of the belt near the knife, facilities are available to take away the punch slugs, and a waste board conveyor is provided. An Ehrsam cut-off knife and punch are used.

The older Coe dryer has been entirely replaced by a new 8-deck steam unit of the same make. The dryer is 415 ft. 8 in. long and is equipped with Trumbone fin coils of extra heavy construction. These steam coils will stand pressures up to 1000 p.s.i., but the normal operating pressure is maintained in the 400 p.s.i. range. Maximum temperatures within the Coe dryer are up to 448 deg. F. with a mean effective temperature of 400 deg. F. maintained throughout the kiln. This high temperature results in a better board and naturally at faster drying rates.

At the take-off of the dryer are the lath breaker, wide board bundling machine and a 5- x 15-ft. "Levelator" that receives the finished products. This device was manufactured by the Rotary Lift Co. It rests in a depression in the floor at the end of the bundling machine. As the stack of wallboard increases in height on this device, the assembly slowly and automatically sinks into the depression until a pile of wallboard about 4 ft. high has been reached. It then raises the pile to floor level and a 5-ton capacity Yale fork truck takes off the loaded pallet, places an empty one on the Levelator, and then hauls the board to the store room.

New Board Device

At the feed end of the dryer, (and it essentially is a part of the transfer assembly from wallboard knife to Coe dryer) a new unit has recently been installed. This is a device that turns the green board over before it is sent into the dryer. This turning of

the board puts the white paper, or finish surface of the board, so as to face upwards before it enters the dryer. This means that the white paper will remain white and not become stained or off-colored from contact with the rolls in the dryer. It is just another example of how plant research and development has made another step towards making "Gold Bond" wallboard a premium product.

Steam for the dryer and other plant uses is supplied by a battery of Combustion Engineering Co. coal-fired boilers that have a rated capacity of 780 hp. Around 60,000 lb. of steam per hour at 400 p.s.i. are maintained. Adequate coal handling and storage facilities are available for the steam plant so that labor here is kept at a minimum.

Baltimore Plant

THE BALTIMORE PLANT is the newest gypsum plant and was designed to receive waterborne rock from the company's Nova Scotia deposits. To tide the plant over the winter months when water haulage ceases, storage facilities are provided for 200,000 tons, of which half is under cover. Minus 5-in. rock is unloaded by a large-capacity clamshell rig with 3-drum scrapers doing most of the trimming. Primary unloading is at the rate of 200 t.p.h. Handling to and from the stockpiles is by belt conveyors. In the stockpiling assembly, belt conveyors and bucket elevators were originally used but more recently the bucket elevators have been dispensed with and replaced by belts. For building stockpiles 30-in. belts are used, and reclaiming is via 24-in. belts. The conveyors are all Link-Belt with U. S. Rubber Co. belting. To facilitate movement of the crude rock to the reclaiming belts a large capacity tractor scraper is used.

At this writing a large all-steel and concrete warehouse is being constructed at Clarence Center so as to better serve the dealers in the area. About 40 to 45 percent of the plant's output is shipped by trucks and truck loading wells have been provided to expedite these shipments.

The plant is the home of the main research laboratory for the company, although all plants have their own research staffs and problems. Decentralization of research is considered more applicable to the company's needs but overall supervision of research is from the Buffalo and Clarence Center operations. In addition to the research laboratories, control laboratories are maintained so that each step in the manufacturing product is carefully controlled.

The Baltimore plant covers some 16 acres of ground in the Canton harbor district of Baltimore in a market area calculated to have a population of about 12,000,000. Warehouse facilities will accommodate 9,000,000 sq. ft. of wallboard. It is a neat, clean and well engineered plant. The buildings are of steel construction with brick used for the lower section of some buildings and covered with metal sheeting. The interiors are lined with insulation board made by the company. The plant was designed by the company engineers but was built under contract. At the time the contract was let, the Baltimore plant was one of the largest single contracts ever let for industrial construction in the Baltimore area.

Calcining Kettles

In keeping with the company's policy of maintaining quality, which means close plant control, in the newer plants kettles are used for calcina-



Aerial view of the plant at Baltimore, Md.

tion purposes as this type of unit lends itself to easier and more accurate control of all phases of the calcining cycle. The Baltimore plant has four 16-ton capacity Ehram kettles equipped with pressed steel bottoms and conventional assemblies. Space is available for future addition of two more kettles when necessary. The four kettles, operating on a 2-hr. cycle, will turn out 750 tons of stucco per 24 hr. The kettles are equipped with Koppers electrical precipitators for dust control. Similar units are used on the Hardinge dryer that is a part of the preliminary rock treatment section. The minus 5-in. rock from the storage piles first receives preliminary crushing through a Pennsylvania ring crusher and a reversible hammermill of the same make with Tyrock vibrating screens used as a scalper ahead of the first crusher. Stucco in the hot pits can be screened through a Tyler type 38 Hummer screen to remove any foreign matter should it be desired.

Wallboard Plant

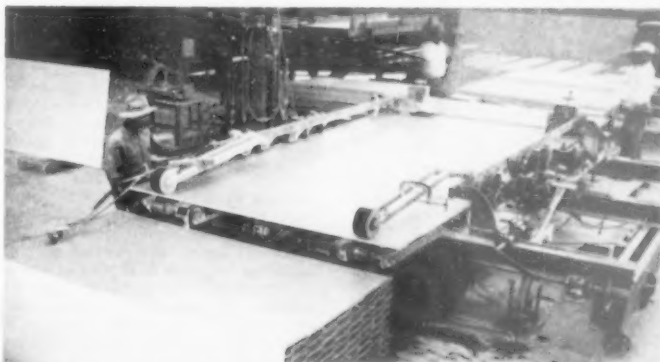
For grinding ahead of the kettles, there are four Raymond roller mills each equipped with an 8-ft. cyclonic-type dust collector with filter bag units at the vents. Regrinding of stucco for the plaster trade is by a 7- x 22-ft. Smidth tube mill.

The wallboard plant is in a building 775 ft. long and 100 ft. wide with the wallboard machine occupying about $\frac{1}{3}$ of the building. The assembly incorporates all the latest equipment to make wallboard and lath of high quality and at rates that are better than average for the industry. In studying the available data recently gathered on this outstanding plant and comparing it with the data we published in the March, 1948, issue of *Rock Products*, there does not appear to be any limit to the ingenuity and skill of the operating staff augmented by the research and engineering departments to making a better product, and making it faster. If one reads the introductory articles in this issue, President Baker's philosophy is that a job well done is only a gain of a few yards in the ceaseless drive for more efficient operations. The Baltimore plant, as well as the others we have inspected, could be cited as an example of this basic thinking of the entire company.

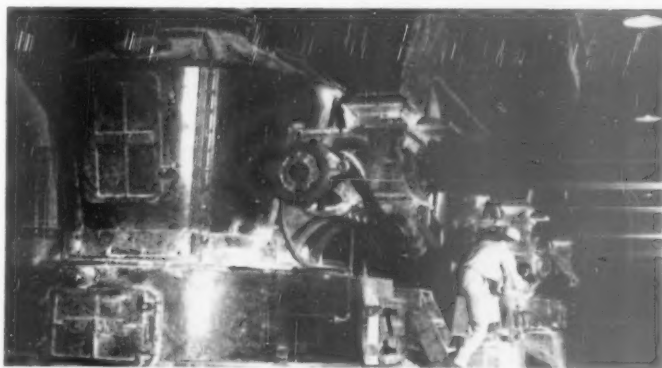
The plant is practically dustless with dust collectors of various designs strategically located throughout the plant. Besides the electrical precipitators and conventional cyclone dust collectors used, the installation includes Sturtevant and Sly collector units. General housekeeping at this plant is near perfect with safety playing an important part in keeping the entire operation on a high production level. This plant was described in detail in the March, 1948, issue of *Rock Products*, pp. 84-89 and 103.



General view of open rock storage at the Baltimore plant; calcining building is at left



Take-off end of dryer. Here the wallboard is packaged and loaded onto pallets by automatic equipment



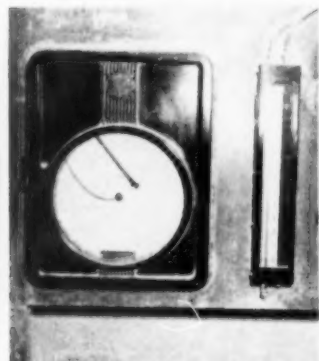
There are five grinding units ahead of the kettles at the Baltimore plant

Below: Wallboard machine in operation

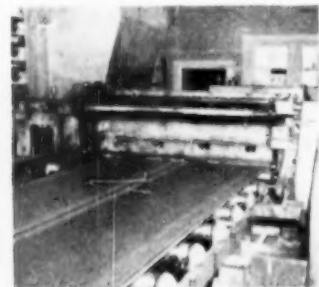




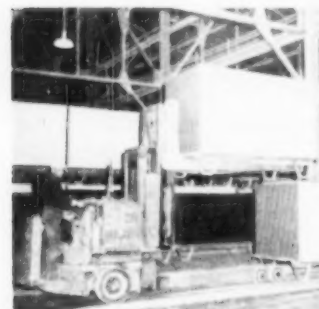
Gypsum slurry pouring from high-speed mixer onto liner paper



Recording thermometer on rotary dryer



Wallboard cut-off knife cuts green board to length



Lift truck removing a pallet of finished wallboard

Savannah Plant

THE SAVANNAH, GA. PLANT is the most southern of the Atlantic Coastal plants and from it the company's products are shipped to all the important markets in the southeast. During 1947 and 1948, it was enlarged as part of the company's policy of expanding its production facilities during the postwar periods. In view of present developments and trends towards allocations and possibly more controls over steel and other critical structural materials, the move has proved a very wise one. It is a large, ultra-modern plant, strategically located for rail and water shipments and fully able to take care of the needs of the company's many dealers in the southeast for the critical years ahead. It is a plant so well engineered in its original design that, when comparing data accumulated during 1948-49 with that recently gathered, it was found that the main changes were made only for the purpose of gradually stepping up all phases of production.

Similar to all the coastal plants, facilities for large stockpiles of crude gypsum rock were provided. Because climatic conditions will permit, outside storage is used exclusively and a pile of about 190,000 tons of minus 5-in. rock (previously washed and screened) is on hand when navigation ceases late in November of each year.

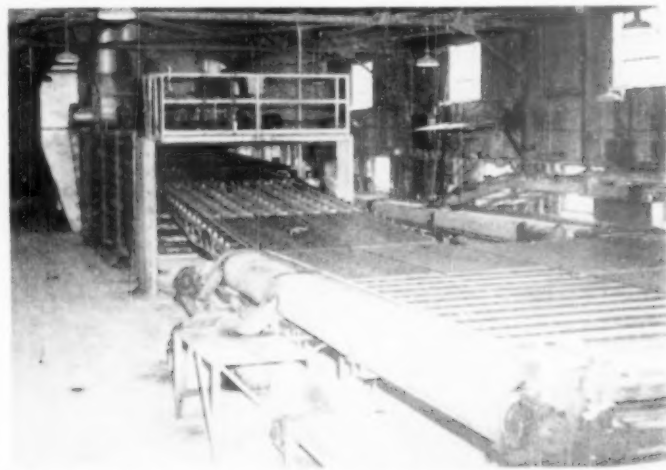
Building up and reclaiming from the stockpile is by belt conveyors, but instead of the conventional reclaiming tunnels a portable field hopper spans one of the major belts in the stockpiling assembly and segments of the conveyor system can be used either to build up the stockpiles, or to divert directly and indirectly to the plant. This Robins stacker and re-

claiming assembly is noteworthy because of its simplicity and its use points to an economical method of reclaiming from large stockpiles where, because of sub-surface water conditions, a reclaiming tunnel would not be practical. The field hopper is loaded by one of two clamshell rigs with a Lorain and Northwest unit being available. An Allis-Chalmers tractor and dozer is used to push the rock close to the clam rigs.

This plant, like all the gypsum plants of the National Gypsum Co. we have inspected, features the use of parabolic steel bins to a high degree. These bins are used for storage of the larger sizes of gypsum rock in the precalcining sections of the mill. Some silos are used for storage of the finer materials. In the raw preparation departments it also has standardized on Pennsylvania single roll and Pennsylvania reversible hammermills and early in the processing a scalper screen is featured with a Stearns stationary magnet suspended over the feed belt to the scalper screen. Slow moving but large capacity Link-Belt bucket elevators are also used to a considerable degree. These elevators are positive dumpers and fit well into the general design of the plant. Drying of the washed crude rock is by Hardinge dryer with a Todd oil burner and Bailey temperature control units.

In the calcining section are four 16-ton capacity, Ehrsam oil-fired kettles and four low-side Raymond mills do the fine grinding. St. Regis packers are used in this plant, as is the case in practically all the other plants, and paper bags are used almost universally.

The wallboard plant uses company



In the foreground is the transfer table, in background green board are going up the elevator to the dryer



Stocking and reclaiming belt eliminates need for reclaiming tunnel at Savannah



Main control board at Savannah plant

designed and company built forming equipment for wallboard and lath. The take-off and bundling equipment are also company made. No soak belts are used. The belt is about 600 ft. long and can make board up to 4 ft. wide, or three strips of gypsum lath. The longest board made is usually 12 ft.; however, any predetermined length of board can be made but longer lengths are difficult to handle and load into box cars. Practically no shipments are made by truck from the Savannah plant. Drying of the board is in an 8-deck Coe steam dryer that has all the automatic features in this type of dryer which includes the automatic transfer table and electric-eye functioning tipple table. A battery of Combustion Engineering Co. boilers generates the steam for the dryer.

Warehouse Facilities

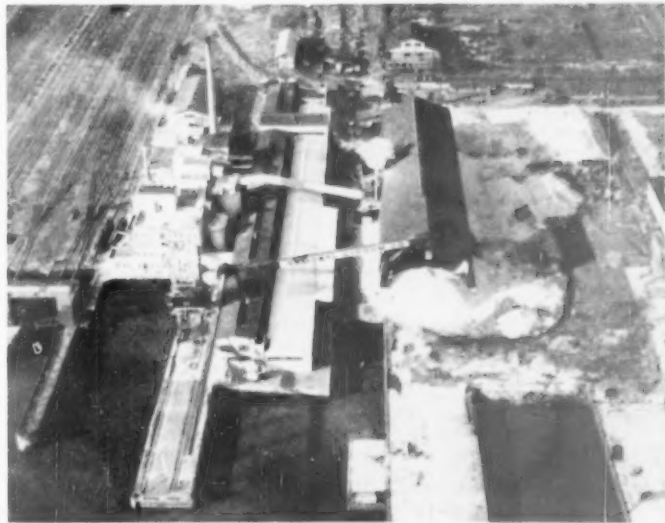
Additional warehouse facilities were added to the plant to load split cars more economically, for the warehouse carries in stock many items—sacked fibered hardwall, unfibered hardwall, casting, moulding, pottery finish, dental and other types of sacked plaster as well as the company's metal lath, sacked lime products, sanded and perlite wall plaster (in bags), acoustical materials, insulation boards and insulation products. To ship these quickly and to get a mixed car to the dealer exactly when he wants it—not too soon, not too late, but on the dot—is the main purpose of the large warehouse program that is featured at practically all of the company's plants. This program alone is costing in seven figures and is just one illustration of the company's emphasis on serving its dealers better and better. The Savannah plant was completely described in the July, 1949, issue of *Rock Products*, pp. 60-64.

New York City (Bronx) Plant

THE NEW YORK CITY (BRONX) plant of the National Gypsum Co. is one of the company's largest capacity plants. It has five kettles. During the past few years the plant was practically rebuilt and to such an extent that it is essentially a new plant. Water-borne rick, both white and gray, are stored under cover. Truck shipments from the plant account for around 95 percent of the output. The extent to

which the plant has been equipped for palletizing its products and to quickly load trucks for ease in rehandling at destination is covered in a separate article on the subject of transportation, beginning on page 115 of this issue.

At this location, the National Gypsum Co. manufactures its line of flat paints marketed under the name of "Gold Bond Sunflex."



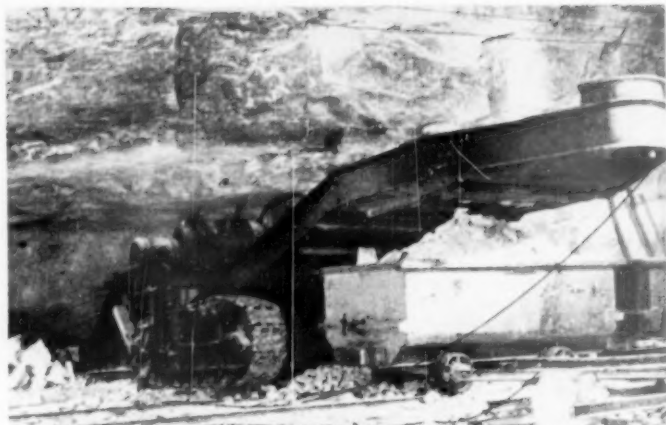
The New York City (Bronx) plant as seen from the air

Medicine Lodge Plant

THE MEDICINE LODGE, KAN., PLANT, formerly owned and operated by the Best Bros. Keene Cement Co., was acquired by National Gypsum Co. in 1937. The older operation specialized in the production of fillers and Keene's cement, a pure white gypsum product that finds many uses because of its hard setting, high tensile strength and expansion properties that make it ideal for casting purposes. Keene's cement is shipped continent-wide and much goes into foreign trade. Many other gypsum companies have tried to manufacture a product to compete with this material but only one and possibly two have been able even to approach the quality of the product. The secret is not so much in the manufacturing techniques, although these are important, but from the fact that the deposits at Medicine Lodge are exceptionally pure, which means pure white color. Many other deposits have a white rock, but when that rock is calcined to high temperatures the impurities, especially iron, tend to oxidize and instead of a white end product, a flesh color or tan color results. Setting properties are also adversely affected by inherent impurities. Keene's cement is used for the manufacture of artificial bathroom tile, artificial marble and colored stucco; it is the main gypsum filler used in fine papers; it is dead-burned for rubber manufacture, for use in the drug industry, for gauging, dental and surgical plasters and for many other specialized uses.

Keene's cement as now produced is from rock mined by underground methods. Three rotary kilns are used for calcination. The plant has been in operation many years but at this writing the trend at Medicine Lodge is taking a new direction. This change stems from the fact that our population is moving gradually west and south. Twenty-five years ago it would have been unthinkable to build an ultra-modern wallboard, lath, and plaster mill at this site because the population in the areas it might serve were too sparse to even remotely support such a project. But the National Gypsum Co. has anticipated population growth and industry to be established and is going to be on the spot to serve future growth and to supply its dealers in the state of Kansas and in nearby states with wallboard, gypsum lath and the many other structural items, and supply them at a price that is in keeping with the company's policy of high quality at the lowest cost.

The wallboard plant will be supplied from a two-kettle plant. Each kettle is to be of 16-ton capacity, to be fed a product dried through Raymond kiln mills. These kettles, in a



Loading rock in the mine of Medicine Lodge

two-hour calcining cycle, will turn out 400 tons of stucco per 24 hrs. This stucco will go into the wallboard and plaster trades. Keene's cement and high temperature calcined material that is used as a filler in many of our industries will continue to be made in the rotary kilns. The kettles will be equipped with Raymond Whizzer equipment to recover dust at that source. Low side Raymond kiln mills will be used for fine grinding. The plant is now under construction and will be in operation in May, 1951.

The wallboard plant will feature an 8-deck Coe dryer and will be fired by natural gas. It will have the conventional transfer belts, automatic bundling and take-off equipment similar to that we have described in the Clarence Center plant. The board building will be 836 ft. long and 200 ft. wide and will be of steel and concrete construction with corrugated roof and sides. The belt length from the master forming rolls to the cut-off knife will be 560 ft. long. Ehrsam punch and cut-off knife will also be featured. The board plant will have two silos ahead of the mixer. No soak belt is to be used. The mine at Medicine Lodge has sufficient ore reserves to support this new plant for many decades.

The mine has Joy loaders and shuttle cars. The stone is put through a primary crusher at the mine and hauled 26 miles to the plant for recrushing and processing. A surge pile is to be provided at the plant for 50,000 tons storage.

In addition to the new plant, an employee service building is being constructed to accommodate increased personnel, as well as large storage facilities for paper and a large general warehouse. The new plant program was designed by the engineering and operating staffs of the company and is being built under contract by Ditmars, Dickman & Pikens of Muskogee, Okla.

Rotan Plant

THE ROTAN, TEXAS PLANT is the most western of the National Gypsum Co.'s operations. It is a relatively large operation having five kettles. About two years ago the plant underwent a complete overhaul. It is the only plant of the company where gypsite is processed.

Gypsite is an earthy material having a high calcium sulfate content. Some deposits in the desert and semi-desert sections of the west have been formed as residues from evaporation of water, especially of springs, that had a high calcium sulfate content. Naturally it would be difficult to get as pure a gypsite product as compared to the gypsum rock, but gypsite does give an easy spreading wall plaster. The gypsite deposit at Rotan is of exceptional purity and the haul to the plant is eight miles.

The gypsite is dried in special dryers using gas for fuel. The illustration



Operator checks front of gas-fired rock dryer at Rotan, Texas plant



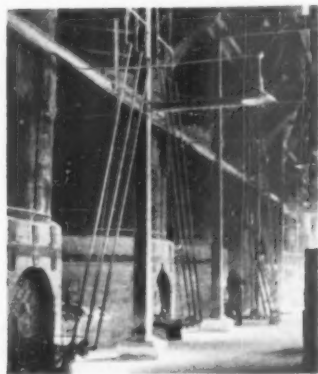
Left: An air view of the National City, Mich. plant. Right: Core drilling at the Michigan quarry

tion shows the dryers to be of an unusual type. At Rotan only white rock is used for board products and for some white plaster products.

Fort Dodge Plant

THE FORT DODGE, IOWA plant gets its supply of rock from open-quarry operations. Mack rear-dump trucks are used for transportation of rock. Stripping is heavy in some parts of the quarry. Trucks have replaced the older aerial tramway which formerly handled the rock. A Lorain shovel is used for primary loading with wagon drills for the drilling.

Additional warehouse space was built to provide increased storage space for paper and finished products. The plant from raw materials section to the finished wallboard unit is now being enlarged. These changes will increase the capacities of the various production steps as well as make a better quality material and at lower costs. There are four kettles in the present plant and a fifth is being added. Practically all the finished materials go out by rail from this plant.



Calcining kettles at Fort Dodge, Iowa are gas-fired, using three burners per kettle

National City Plant

THE NATIONAL CITY, MICH. plant is an open-pit mining operation with stripping under contract. For the latter work, a Euclid "Self-loader" in conjunction with bottom-dump Euclid trucks are used. This type of equipment for stripping and development work is working quite satisfactorily, it was said. At this location, stripping is extensive and it is estimated that 2,150,000 cu. yd. of overburden have been handled in the last ten years.

The plant has five kettles and, like the others, uses Raymond mills for fine grinding. About a year and one-half ago overhauling of the plant was practically completed, although currently additions are being made to the wallboard plant and to the warehouse facilities. In the mill an additional Raymond mill and a new dryer were installed with a revision of the flow of material through the plant for more efficient operation. Like the other wallboard and lath plants the productivity has been increased by speed-ups and adjustments.

Portsmouth Plant

THE PORTSMOUTH, N. H. gypsum plant is the most northern coastal plant and serves the New England markets. It is a two-kettle plant with rock drying facilities, a wallboard and gypsum lath plant, and warehouse facilities that are being expanded to handle the constantly growing number of items the company produces. About 60 percent of the plant's output is shipped by truck.

Rock storage near the docks provides for separation of the gray and white rock, with trucks and a power shovel used for handling the crude rock from dockside storage to the plant that is a short distance away. Specialty plasters made from pure white rock are a featured product here. Improvements in the plant

during the postwar period have been in the nature of faster drying, higher belt speeds, and increases in the distribution facilities.

Akron Plant

THE AKRON, N. Y. PLANT formerly secured its rock from underground mining operations adjacent to the plant, but mining has been discontinued and all the plant's requirements are hauled from the Clarence Center operation, a haul of about 15 miles, by trucks. The Akron plant is the only one of the company that

uses rotary kilns for calcining and here there are two units in service that have a combined capacity of 25 tons per hour. Pulverized coal is used for fuel. The plant manufactures plaster, wallboard, and lath and certain specialties for other plants.



Lloyd S. Moore, Akron plant manager



These 110-ft. rotary kilns at the Akron, N. Y. plant are operated around the clock, calcining 25 tons of gypsum rock an hour

LIME PLANT OPERATIONS

Bellefonte Plant

CHEMICAL LIME IS PRODUCED IN rotary kilns at the Bellefonte, Penn., plant which is one of two limestone operations of the company. The plant was built in 1936 by the Chemical Lime Co. and was purchased in 1940 by National Gypsum Co. As originally built, it had an 8-ft. 6-in. x 7-ft. x 400-ft. Traylor rotary kiln of welded construction which was the longest lime kiln then in operation. National Gypsum Co. immediately invested three-quarters of a million dollars in the plant, and the plant now has a second kiln measuring 8 x 425 ft.

The limestone at Bellefonte is among the finest high calcium formations anywhere. The deposit is nearly vertical, is 75 ft. wide and extends to tremendous depth. Entry into the mine is through an 18 deg. incline for a distance of 900 ft. to the original working floor. It is a stoep mine and now is being worked on levels, with cars operating on the lower level receiving their loads through grizzlies.

Diamond drilling was adopted at

Bellefonte several years ago and with excellent results in drilling from 120 to 160 ft. across the entire width of the stoep, followed by electric firing to bring down 12-ft. slices across the entire area of the stoep. Using diamond set bits driven by rotary air drills, as much as 25,000 to 30,000 tons of stone are brought down for each 2½-3 tons of dynamite. Cars hauled by a 4-ton electric locomotive deliver the stone to a primary crusher down in the mine and a 5-in. topsize product is elevated out of the mine by belt conveyor to a Traylor gyratory secondary crusher. Development of a lower level in the mine and the drilling pattern being followed are covered in a separate article which considers quarrying and mining practices. Joy loader and shuttle cars are to be used in the mine for loading cars.

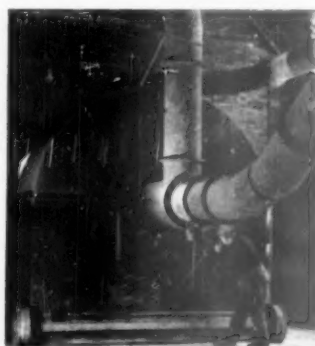
Stone is reduced to 2½ in. topsize through the secondary crusher and then screened into separated sizes for kiln feed. Kiln feed sizes are 1¼-2½

in., 1¼-1½ in., ¾-1¼ in., and ¾-¾ in., each stored in a bin of 1000-ton capacity. The fines are diverted by belt conveyors to the flour plant for pulverizing into glass-stone, mine dust, agricultural limestone and other products. A Pennsylvania hammermill closed-circuited with a Hummer screen and an air separator grinds products in the 1/10-in. size range and two Raymond high-side 5-roll pulverizers with whizzer separators produce 200-mesh products. Limestone is first dried through a 6- x 58-ft. coal-fired Hardinge rotary dryer. Stone products are bagged by 3-tube bagging machines.

The kilns are driven by 4-speed electric motors and have a speed range between 43 and 86 r.p.m. They are fired with coal by Raymond direct-firing bowl mills. Lime is ground by a Jeffrey hammermill to minus ¾-in. Hydration is done in a Schaffer continuous hydrator. Hydrated lime products are pulverized by Raymond automatic pulverizers. Pebble lime is shipped in bulk to steel mills, tanneries, paper mills, to water purification plants and to chemical companies. Hydrate is bagged and shipped for chemical use, for spray and for masons and agricultural lime, etc.



View showing the rotary kilns at Bellefonte, Penn. lime plant



Firing hood of long kiln showing piping for coal and air



Feed end of the screening plant as seen from under conveyor to screening building



The Kimballton plant produces lime from extremely pure limestone

Kimballton Plant

THE KIMBALLTON, VA. PLANT, which began production in September, 1947, as an entirely new plant, is one of America's largest and finest rotary kiln lime plants, featuring the most modern operating practices anywhere for the production of quality chemical lime.

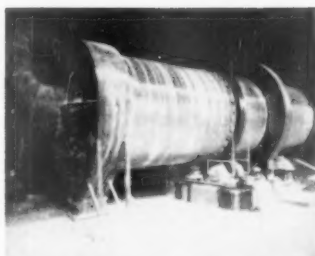
Kimballton, Va., is on the sight of one of the purest high calcium limestone deposits in the United States and, as a result of the near absence of impurities, the lime produced is suited to a great variety of selective uses in the chemical industry throughout the south and southeast.

Among the principal industrial markets for Kimballton lime are the paper, carbide, leather, steel, water softening, tanneries and the general chemical industries. Other products are agricultural limestone, calcium carbonate feed supplement, pulverized mine dust, agricultural hydrate and spraying hydrate. Capacity of the plant is approximately 600 tons of pebble lime per day.

This is a mining operation, with the ledge of stone, 76 ft. thick, dipping 37 deg. The pattern consists of driving horizontal tunnels spaced 70 ft. apart and as the tunnels advance the stone is benched between levels. A jumbo drilling rig, illustrated herewith, permits drilling at three levels with drifter drills. Loading is done by two 1½-cu. yd. Marion electric shovels and diesel-powered Euclid end-dump trucks haul 15 tons to a load up a slight incline out of the mine, dumping into a hopper serving a 30- x 60-in. Pennsylvania single-roll ribbed crusher.

Minus 8-in. stone is conveyed to a scalping screen in the main screening plant, which has sizing screens, a Symons cone crusher, and a flour plant adjoining, to which minus ¾-in. stone is diverted. Kiln stone sizes are 1½- x 2½-in., 1¾- x ¾-in. and ¾- x ¾-in.

The lime burning process is highly instrumentalized. Calcining is done through two 8- x 10- x 300-ft. welded Allis-Chalmers rotary kilns, each of which discharges through an 8-ft. 6-in. Allis-Chalmers tubular rotary cooler. The kilns are driven by 4-speed elec-



Tubular lime cooler showing forced air inlet

tric motors through Falk gear reducers. Both kilns are fired by pulverized coal from direct-firing B & W unit mills and under induced draft. Secondary air for combustion is preheated through the cooler in each case. By use of a cooler under pressure and uncontaminated air for combustion, conditions are ideal for the maintenance of controlled burning conditions. Rate of feed of limestone into the kilns is synchronized with kiln speeds.

Kiln operation is controlled by a complete Bailey Motor Control System from an instrument panel on the kiln operating floor. The instruments are electronic devices that control,



Electric shovel loading limestone to diesel-powered truck in mine at Kimballton, Va.



Loading 15 tons of limestone into mine truck

through pneumatic controllers, the various adjustments.

Lime from the coolers is elevated and screened into silos from which it is withdrawn for loading. Hydrated lime is produced through a Schaffer continuous hydrator and hydrate is pulverized through Raymond mills. All minus ¾-in. stone is converted into pulverized limestone through Raymond 4-roll, high side mills through which heated air is introduced for drying.

An article describing this plant in detail was published in the December, 1947, issue of *Rock Products*, pp. 135-141.

Luckey Plant

THE PLANT AT LUCKEY, OHIO, is a shaft-kiln operation and the stone is excavated from an open quarry. Its location is in the high magnesium area of northwestern Ohio which is famous for its high quality finishing lime. During the war, this plant furnished lime which was processed into magnesium metal in an adjoining government-operated plant.

A mechanization program in the quarry and in the handling of stone, somewhat similar to the development at the York, Penn., plant has just been completed at Luckey. The main difference is that the crusher has been located in the quarry. Until this year, this was a hand-sledge and hand-loading operation. The primary crusher is a McLanahan & Stone single roll, fed by a Jeffrey-Traylor vibrat-

ing feeder from a hopper into which Mack trucks dump. Stone from the crusher is elevated by belt conveyor to the top of the kiln stone storage bins where it is put over a double-deck vibrating screen. Kiln stone is taken off a picking table, selection being necessary to divert the best quality stone to the kilns.

There are 12 Arnold & Weigel coal-fired kilns which are fed 5 to 10-in. stone from cars traveling up an incline from the stone bins in the quarry. The lime is ground into various products and for feed to two Clyde hydrators. Some of the hydrate is autoclaved in order to attain fast-soaking properties.

Smaller sizes than kiln stone are processed into commercial aggregates, flux and concrete block aggregates.



The Luckey, Ohio plant has the primary crushing and screening plant in the quarry

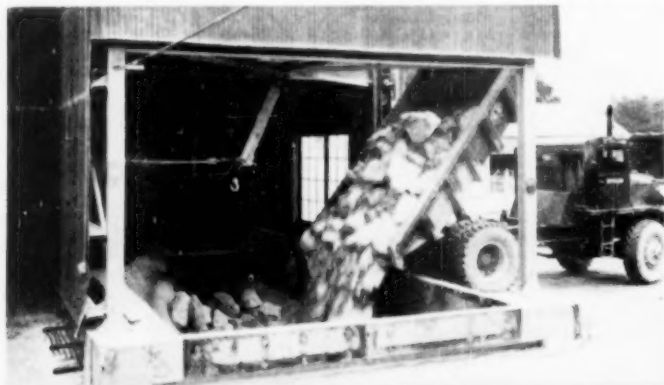


Flat-top steel picking table conveyor at the York plant, at which blue and white stone are sorted



General view of the York plant; tall building in foreground is the new crushing, screening and sorting plant

Below: Dumping a 15-ton load of limestone into receiving hopper at York, Penn., lime plant



York Plant

IN 1935, NATIONAL GYPSUM Co. acquired the York, Penn., lime plant, which is an open quarry operation with shaft kilns and produces chemical lime and limestone products. It is said that this plant's forerunner was the first operation to produce high calcium hydrate in the United States some 40 years ago.

Actually three distinct quarries and a mine are operated. The stone is unique in that it consists of an extremely white, brilliant limestone pocketed in blue and gray stone. White limestone representing one-third of the total is sorted out and processed into products used for marking baseball diamonds, the manufacture of phonograph records, for linoleum, billiard chalk, paint, welding rods, fine papers and other special uses. Limestone burned in the kilns consists of the blue and gray varieties.

Until 1948, hand-sledging and loading of stone was practiced, with cars used for transfer of the separated white stone out of the quarries to the processing plant. Power shovels loaded the balance of the stone. A major improvement was started in 1948 and completed in 1949 to mechanize the quarrying operations, and a modern crushing, screening and sorting plant was completed.

Excavation in the quarries is by two power shovels of 1½- and 1¼ cu. yd. capacity and haulage to the new crushing plant is by end-dump Enlid trucks hauling 15 tons. An inclined roadway was built and the primary breaker, a single-roll 30- x 60-in. toothed Pennsylvania, has been located on the surface, the reason being that stone may be hauled from more than one quarry. The hopper is designed to accommodate either end-dump or side-dump trucks.

The crushing, screening and sorting plant has Link-Belt handling equipment throughout including feeders, conveyors and elevating equipment. Stone is discharged into a hopper from which a 60-in. inclined apron feeder-conveyor regulates the flow into the primary crusher. Product of the crusher is delivered into the boot of a continuous, bucket-type elevator by an inclined reciprocating-plate feeder. The elevator discharges over a 5- x 10-ft. double-deck vibrating screen. Fines are collected into a separate bin and sizes coming over the lower deck go into another bin. That coming over the top deck is put over a 48-in. heavy-duty Link-Belt apron-type picking table 28 ft. in length. Here, the white stone is picked out (from the kiln stone or blue stone) by hand and diverted to separate bins. The blue stone for kiln feed is 4- to 8-in. size. The various bins, holding 200 tons each, and from which the materials are directed to the kilns and to

the stone processing equipment, provide a surge storage capacity that has proved desirable.

Minus 4-in. blue stone is ground in Raymond mills into mine dust, mineral feed fillers, chicken grits, agricultural limestone, etc. The white stone is put through separate mills for pulverizing into special, higher quality products.

Lime is calcined in two 24-ft. diameter x 80-ft. high vertical gas-producer kilns that are probably the largest in the United States. They are Azbe kilns with center walls dividing each kiln into two parts with a center burner and two side burners for each side. Capacity ranges between 80-

150 tons of lime per day for each kiln or a ton per sq. ft. of effective cross sectional area per day. The gas producers are 10-ft. 6-in. Chapman units.

Lime is drawn at 1½-hr. intervals, and is put through a hammermill for reduction to minus ¼-in. for feed to a Schaffer continuous hydrator. Hydrate is put through two Raymond pulverizers and bagged. Most of the production of lime is converted to hydrate. Ground limestone products are produced through five separate Raymond mills. Another improvement has been construction of storage facilities for 5000 tons of bagged products to provide, principally, for the peaks in demand for agricultural limestone.

MINERAL WOOL PLANTS

Waste heat boilers generate steam for blowing fibers

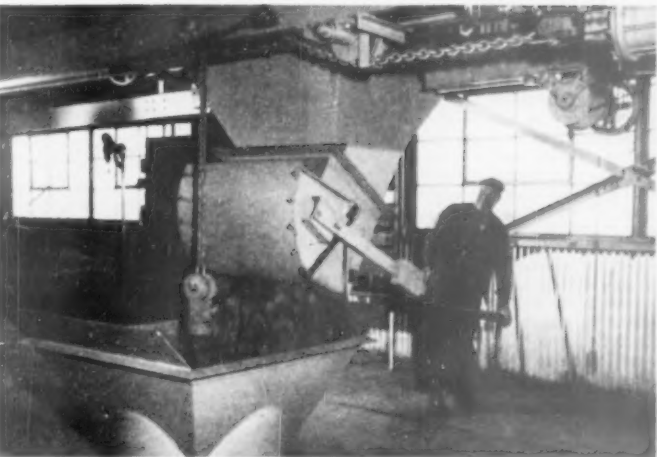
NATIONAL GYPSUM Co. operates three rock wool plants which are among the most modern and efficient in the industry. The Dover, N. J., plant and the Alexandria, Ind., plant each have four vertical cupolas and the Mansfield, Mass., plant has two cupolas. They are all fired by the conventional layer method, using slag as feed and coke as fuel and each produces a full-line of batt products and granulated and loose wool. Each has the conventional blowing chamber and uses a 6-stream split and steam at 100 p.s.i. to blow the fibers from the melt.

As part of the postwar modernization program of the company, the two largest plants have been completely mechanized. Automatic weighing equipment has been installed featuring overhead bins from which batches are weighed out and conveyed to the respective cupolas by lorry. Previously each cupola had an individual skip charging bucket. Controls for batching are centered on the charging floor at each plant.

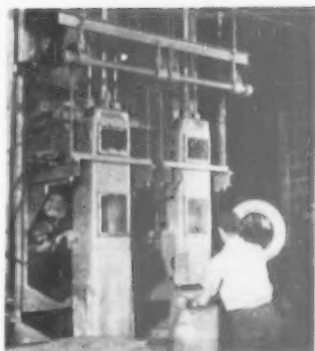
By far the most important development at these two plants has been installation of individual waste-heat boilers for each cupola to recover heat from the gases to generate steam for blowing wool. The company has patents pending on this installation. Gases are drawn at almost 1400 deg. F. from the top of the bed in a cupola and the boilers exhaust at about 450 deg. F. The cupolas are charged from the sides near the top of each. An oil-fired auxiliary is provided to supply any needed steam over and above that generated by waste heat, if required. Operation must be kept in perfect balance and is being done effectively with considerable overall fuel saving. All three plants feature mechanical weighing and automatic bagging machinery.



The rock wool plant at Alexandria, Indiana



Feeding charge to cupola; note air ram in upper right corner



Bagging granulated slag automatically

QUARRYING AND MINING PRACTICES

Company operates underground mines as well as open quarries in both gypsum and limestone. Diamond drilling is practiced at Bellefonte limestone mine

THE MINING PRACTICES of the National Gypsum Co. are divided into two classes: (1) surface or open quarry mining and (2) underground work.

The open quarrying of gypsum deposits is not a difficult operation as the rock is relatively soft and easy to drill. It shatters reasonably well (if anything usually on the blocky side) and large tonnages per pound of explosive can be obtained.

Stripping can be more of a problem than the quarry work and here the soft character of the rock is a disadvantage, for most surface gypsum deposits weather and erode so easily that the surface tends to be pockety. These pockets fill with dirt, clay and other foreign matter. Often the top few feet of rock is crumbly or "sugar rock" which has to be cast aside as not meeting the high quality set by the trade.

At the National City quarry in Michigan the National Gypsum Co. strips under contract using a small dragline loading into Euclid tractor wagons, each hauling 15 cu. yd. It takes from four to five minutes to load one of these wagons. They are said to be ideal for development and stripping purposes.

Stripping at the Nova Scotia operations entails removal of trees and brush and possibly a pass or two with a tractor and dozer and thereafter, because of the pockety nature of the terrain, selective stripping is practiced. However, as the stripping is mostly loose soil and loam, not too accurate cleanup is required before mining the pay rock, for all the rock, after crushing to 5-in. size, is thoroughly washed and the waste fines stored in tailing ponds near the quarries. Drilling is by means of Permance auger bits of reasonably large diameter. These gas-driven rigs are used to drill toe or lifter holes for the quarry work. In general the mining practices at the other quarries are towards larger truck haulage equipment, towards moving the primary crushing plant near the floor of the quarry and crushing underground in the mines. As many of the quarries now operated by the company were acquired by amalgamation and merger, present day quarry practices follow along much the lines set by the earlier operators, and any standardization of

equipment is confined to each operation, with the aim of having one make of equipment at each plant. Most company-owned trucks are either Euclids or Macks and are all rear dump. At Nova Scotia, Northwest shovels have been in use for years and these load to Walters and Euclid trucks; at Fort Dodge, Lorains are used. Open quarries use churn drilling, especially for the higher faces. Wagon drills are preferred for the shallower faces and to add selectivity to the quarry operations. Joy loaders are used in three of the underground mines, at Bellefonte, Penn. (limestone), Clarence Center (gypsum), and Medicine Lodge (gypsum).

Core drilling is used for exploratory purposes as a general policy. The mining staff of the company has been a pioneer in the use of diamond drill holes for strictly mining purposes, and the techniques used for driving a raise, sinking shafts, and rock production will be briefly described later in this summary.

For exploratory drilling, the number of holes drilled depends on the nature and quality of the stone. At Clarence Center, where the gypsum beds are about 60 ft. below surface and are remarkably uniform in thickness and quality, holes are spaced as far as 800 ft. apart. The work is carried ahead of mining at such distances as to return any information gained in time

to make it usable. The limestone deposits at Luckey, Ohio, have been completely explored, and National City, Mich., has much detailed information on the nature, size and structure of its deposit. The company uses Sullivan No. 7 core drills for this work, and most of the drilling is done by company crews. Diamond drill runners and crews are switched from plant to plant. Their rate of pay is about the same as the underground miners.

Shaft Sinking at Bellefonte by Diamond Drilling

The earlier attempts at shaft sinking by the use of diamond drills was in some of the western metal mines. The method recently was adapted to sink a 5- x 6-ft. air shaft at the east end of the Bellefonte limestone mine where a lower level is under development. The method consisted of first drilling a 5¼-in. diamond drill cut-hole from the surface to 236 ft., the finished depth of the air shaft. This hole was not loaded but served as a relief chamber for the 1.5-in. holes that were drilled and blasted around this "burn" or relief hole. The 1.5-in. holes were drilled at predetermined locations around the relief hole and drilled to the bottom of the shaft. The smaller holes were not cored but were drilled using noncoring EX (1.5-in.) bits of the concave and pilot types.



The Nova Scotia quarry is covered with "pot holes," which influence operating methods

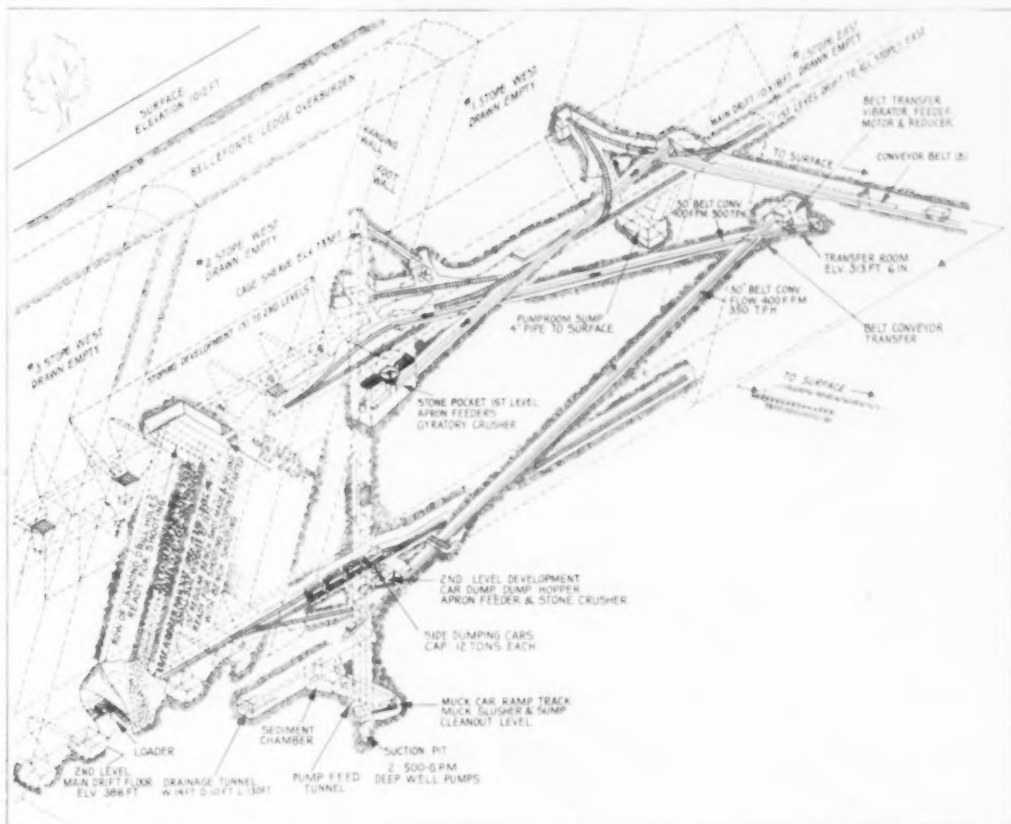


Diagram of the limestone mine at Bellefonte, Penn., showing the location of equipment and levels

Loading is from the top with the lower ends of the smaller holes shot first and then shot progressively upwards. This allows the blasted muck to fall in the chutes at the haulage level. Ten foot shots were found to be best as longer lift-shots tended to plug the raise. Loading of the hole was accomplished by first lowering a 4-in. piece of wood into the hole by means of a fine steel wire. By the "feel" the plug could be spotted near the lower end of the drill hole. Then a few handfuls of stemming followed, after which came the slitted dynamite which was tamped in place by a 2-ft. length of 1-in. solid brass rod operated through a clothesline rope. Firing was by electric delay caps in sequences such as 0-3-6.

The method was found to be safer and faster than conventional raise driving, for in a normal raising operation, miners have to bar down the loose rock after each blast. Also when working in a practically vertical raise, miners must work from stulls with improvised ladderways and working platforms, all of which adds up to a rather hazardous way of earning a living. The core drilling method did

have certain defects, such as finding it difficult to maintain proper hole alignment.

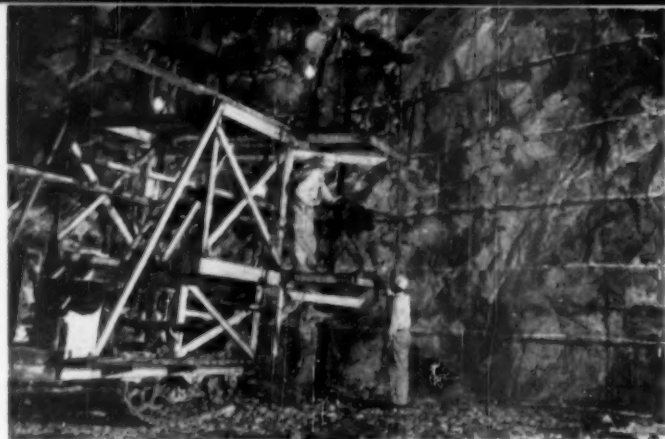
From this experimental shaft sinking work, along with other diamond drilling as practiced in the older stope, a rather new and novel method of raising or shaft sinking has been evolved.

Old Stopping Methods

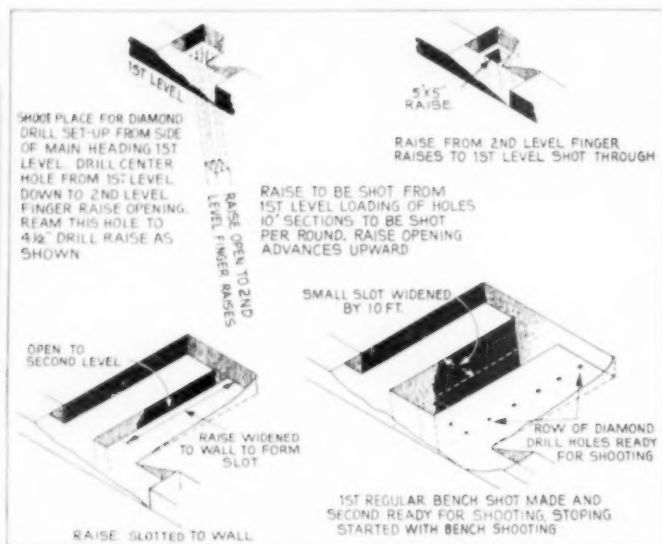
The Bellefonte mine is on a limestone ledge that is from 55 to 70 ft. thick and dips to 72 deg. from the horizontal. The ledge is a very pure high calcium limestone containing 98.5 to 99.0 percent calcium carbonate. At the time the air shaft discussed above was sunk the mine had been opened up to a depth of 330 ft. and shrinkage stoping was practiced with stopes 300 ft. long and separated by 40-ft. pillars. These shrinkage stopes had lifts from 150 to 190 ft.

By referring to the figure (p. 114 bottom), one of the older stopes is shown near the top of that drawing. The cross section at left shows the stope, finger raise, grizzly, chute raise, and chute, as well as the sub-drift. The pillars have almost vertical man-ways

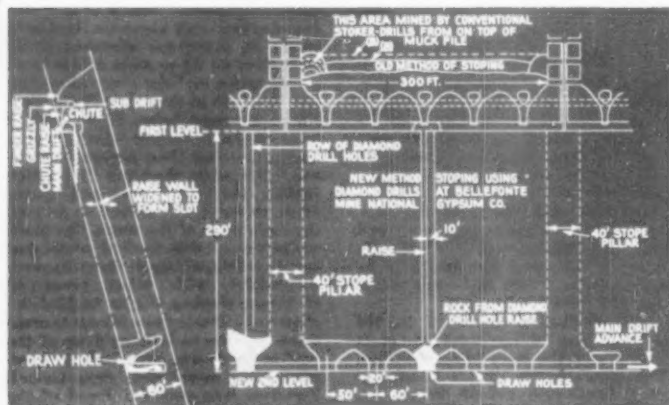
driven through their centers with sub-levels at 25-ft. centers, as shown in the upper part of the drawing. In starting the shrinkage stoping operation, drilling was from on top of the muck pile. Next, at each end of the room, stoping was continued upwards by conventional stoper drills until the top of the chamber was well above the next sub-level. At that time diamond drills were then set up so as to drill a horizontal series of holes clear along the 300 ft. length of the stope. These were 1.5-in. noncored holes. Drilling rates were in the 16 in. per minute range. On the drawing, these horizontal holes are indicated by the letter "B". After loading they were shot and thereafter no one was required to go into the main room of the stope. The main advantage of this method of mining was in safety, although the costs were competitive with other types of shrinkage stoping. It also enabled the stope to be drawn down almost to emptiness because no barring down of the roof or backs was practiced or necessary. This meant that once enough limestone was over the throat of the finger raise to protect everything below, all other rock could be drawn



Jumbo in place drilling multiple blast holes in limestone mine at Kimballton, Va.



New mining method using diamond drilled holes blasted from the bottom up to make raises at Bellefonte



Stopeing method with diamond drills at the Bellefonte mine

down into the chutes as needed. This reflected in less tie-up of capital in broken rock in a stope than under normal shrinkage methods. In ordinary shrinkage stoping the miners work on top of the broken muck and only enough rock can be drawn out each day to equal the "swell" of the broken rock as compared to rock in place.

From this work and that previously discussed, another and newer method is now being practiced at Bellefonte to mine below the older stopes.

New Mining Technique

A main haulage level has been driven 292 ft. below the haulage level serving the stopes discussed above. The lower stope to be mined will be about 300 ft. long and the limestone at that point is about 60 ft. thick. After the haulage drift was driven, short cross cuts over to the footwall were driven and conventional finger raises put upwards on 60-ft. centers. No grizzly or chutes are used; the broken rock falls to the floor under the finger raises where a Joy loader picks it up and loads it to cars. After the finger raises were all in order, the next step was to drill diamond drill holes (1.5 in.) near the center of the stope at inclinations practically paralleling the dip of the limestone. This hole was then reamed out from the bottom upwards to 5 1/2-in. diameter by a special reamer. Around this larger hole were drilled additional diamond drill holes as indicated in the first sketch of the four series of drawings grouped at left. These diamond drill holes were blasted from the bottom upwards, using techniques quite similar to those previously described, thus making a raise roughly 5 x 5 ft. in cross section and the height of the stope. The raise was then made into more of a long slot by additional vertical diamond drilling and the slot reached the full 60 ft. width of the proposed stope. Meanwhile, all blasted rock fell into the pockets below and was removed by the Joy loaders. When the slot had reached the full width, stoping continued by slicing off vertical segments of rock and receding toward the pillars, until the room was all mined out. Practically vertical diamond drill holes for mining were used.

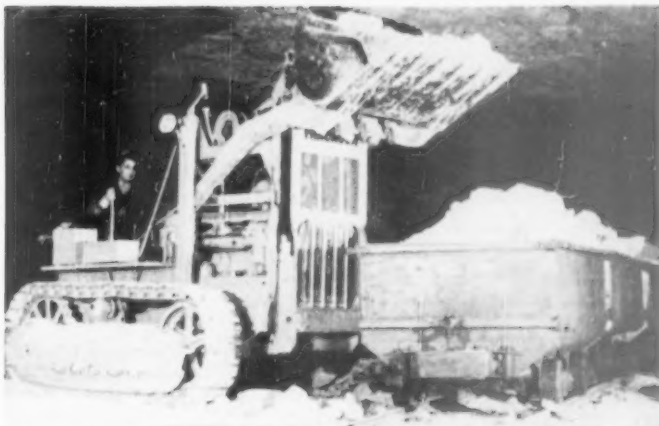
This method does not require any vertical raises in the pillars or the 25-ft. sub-levels. It is safe because the miners are always working under proved safe ground, and rock can be drawn out of the stope as needed. The stope now being mined will yield about 400,000 tons of high-grade rock and one to two stopes will keep the Bellefonte lime plant up to its present capacity. When the stope is mined out it will not be filled with waste rock. If need be, stoping can continue to the property end lines, or to levels below the present mining operations—levels as yet undriven.

This mining method has a disadvantage as far as safety is concerned,



Core drilling at National City, Mich.

because the miners are always working near the brink of a high cliff-like structure; unless adequate underground lights are provided, or special guards erected, the work could be hazardous. The vertical slices for mining purposes have about 10 ft. of



Loading gypsum rock from one of the purest deposits in the world, at Medicine Lodge, Kan.

burden. The bits for the noncoring diamond drill cost about \$150 each and an average of 4500 ft. is secured per bit, with a high of 11,000 to 12,000 ft. per bit. The bits, when worn badly, are reset at the factory with scrap dia-

monds, or sent out for reconditioning by Wheeltruing Co. of Detroit, Mich.

The work is being carried out under the direction of the plant operators in cooperation with D. E. Eilertsen, mining engineer, whose headquarters are in the Buffalo offices.

TRANSPORTATION OF PRODUCTS AND RAW MATERIALS

Trend to palletized handling and trucking finished products to expedite delivery to dealers; cargo ships and large trucks used for rock haulage

TRANSPORTATION OF GYPSUM and gypsum products by the National Gypsum Co. is a very broad subject and embraces water transportation of the crude rock, rail transportation, truck transportation, and transportation related to foreign trade. Within the framework of the company is a total of 28 staff members devoted to traffic under Robert F. Mackrell, director of transportation. Many of these are so interested in their work that they attend night traffic schools in Buffalo regularly.

The water transportation of the crude rock from the three quarries in Nova Scotia requires a considerable amount of attention and the general pattern of this work is directed from the Buffalo office. The haulage from Nova Scotia totals in excess of 1,000,000 tons of crude gypsum per year for the four coastal plants. The vessels, after unloading, have a return payload of phosphate rock. This is loaded either at Boca Grande, or Tampa, Fla. The phosphate rock is transported to Montreal, Sorel and other Canadian ports. In addition to this haulage about 100 one-way trips

are made using chartered bottoms. This is for the crude rock hauls. Gypsum rock is shipped by water from about April 1 to November 15 and after that date winter conditions prevent further rock shipments. For the

rest of the year the three ships, the "Dingwall," "Walton" and "Chet-camp" are used in world trade shipping. Crude gypsum rock is also sold to Canadian gypsum plants and to Canadian cement plants, and this rock



Truck signs painted on delivery trucks are good advertising for the company



Loading plaster bags on a pallet



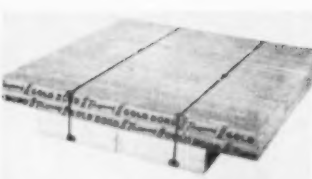
Shipment of palletized bags leaving the yard



Palletized bags are stockpiled to a considerable height



Palletized handling speeds up truck movements



Gypsum pallets for bagged products are part of payload

is also waterborne. The company makes a general practice of selling cement rock to the portland cement industry and on certain occasions, in the past, has delivered an entire shipment to New Jersey ports for eventual delivery by rail to the many portland cement plants in the Lehigh Valley of eastern Pennsylvania. All rock shipped by boat to the four processing plants is unloaded by the company with clamshell rigs of various designs with final clean-up by hand labor. Unloading, in some instances, is at the rate of about 500 t.p.h.

Each ship has to be fully equipped, staffed with trained officers and able seamen. Cargoes must be arranged in advance and a great amount of detail is involved so as to run this phase of the business economically.

Rail Shipping Methods

New and more economical methods of rail shipment are being worked out through the cooperative efforts of the traffic and other departments of the company. The first and impelling objective of the traffic department is to get the material to the dealer when he wants it—not ahead of time, nor a few hours late, but exactly at the specified time. During these car shortage days, this alone is a large order so the company has worked out a method of using whatever type of car is available. Prior to the innovations now under way at all National Gypsum Co. plants, most of the gypsum and related wallboard products were shipped in box cars. Some shipments are now going out on flat cars and

the loading is so carried out that the car can be loaded with fork trucks and unloaded similarly at the dealer's yard. For loading of wallboard and lath the risers are bundles of lath or short pieces of 4 x 4's. The flat car is loaded with the fork trucks and a waterproof paper fabric is put over the load. These are then lashed in place by suitable banding. The weatherproof paper put over the load is so crimped at splices or joints that wind or rain cannot get to the products being shipped.

Flat cars have another advantage in that, as a rule, they can be loaded heavier. At the same time, handling costs at the unloading end, it was stated, are \$1 to \$1.25 less per M feet of wallboard than for box car unloading where fork truck use is not adaptable. A small flat car hauls a normal load of 65,000 sq. ft. of board. At the dealer's yard it takes from 16 to 20 man-hours to unload a box car of wallboard or lath under the best of conditions but it takes only about 1/4 man-hours to load a flat car and an equal time to unload it. The plan has been so successful that dealers, in some areas, will accept shipment over any railroad serving their city even at some distance from their yards if the goods can be shipped via flat cars.

The trend during the past two years has been towards more flats. However, so-called "grocery store" orders, or mixed carloads, for shipment on flat cars are not encouraged. The load must be of standard size so that mechanical equipment can be used to load and unload.

At the plants where the new warehouses are now being built, wider doorways are planned to expedite car loadings of all kinds. Prepackaging of sizeable amounts of gypsum products such as lath and wallboard to expedite loading is on the agenda. Car cleaning is a big cost item to the company and efforts are constantly being made to get cleaner cars from the railroads, with some degree of success.

Bulk shipment of gypsum plaster products, bulk lime, etc., is something the traffic department can visualize in the future. The company envisions this as patterned after bulk shipments of portland cement in closed truck, or closed railroad hoppers. Transportation development and research is a permanent set-up in the organization. The department is experimenting all the time with problems of material handling. Talks are encouraged at meetings; membership in traffic associations and material handling societies is encouraged in efforts to get new ideas to better serve their dealers.

Truck Shipments

Shipment of gypsum and related products by truck at the various plants of the National Gypsum Co. likewise is receiving constant study, for the trend is towards more and more shipments via rubber. Use of pallets for truck shipment is also in-

creasing. These pallets are for the most part of wood but in some instances a pallet is made up of two stringers that are bundles of gypsum lath. Across this is strapped a bed made of gypsum wallboard, and sacked material, metal lath, and other items can then be piled on the assembled pallet. This is an ingenious way of solving the "return pallet" problem. In the case of wood pallets, the return of pallets is not too serious for all the "Gold Bond" products go to dealers exclusively. Pallets are charged to the dealer. It usually works out that if several are delivered, an equivalent amount will be taken back by the trucker on his return to the place of loading.

The pallets for sacked plaster usually hold 30 sacks or $1\frac{1}{2}$ tons. The general pattern for trucking from any plant of the company is to deliver the truck load to the dealer's yard—never to the job, even if at the request of a buyer. In the dealer's yard, the load is either unloaded to the warehouse, or, as is now most often the case, the load is immediately transferred to the dealer's truck. This means traffic coordination to a high degree, as neither trucker likes to wait on the other, but the goal is always to keep the dealer satisfied.

Roughly about 30 percent of all the products from National Gypsum Co. goes out by truck, considering the system as a whole. This includes gypsum, metal lath, rock wool, lime, paint, etc. Five years ago truck shipments were about 15 percent of the total. For gypsum products, about 35 percent is now shipped by truck. The Bronx plant in New York City leads with 98 percent of the plant's production being shipped by truck.

The parent company owns some trucks and leases others. Shortage of box cars is increasing the leasing practice. The company has about 20 contract carriers as well. Regardless of the situation as regards hauls, the company makes it a policy to have some type of transportation available and there are no interruptions because of lack of some kind of haulage facility.

The Bronx plant has 12 loading "wells" for trucks to back into to expedite loading. Pallet loading is practiced to a high degree. Truck loading starts at 2 p.m. and usually ends around 10:30 p.m., or at least slackens off greatly at that time. There are 70 to 80 trucks per day leaving the Bronx plant. Some of the contract truckers have a dispatcher at the plant and the company also has one of its own. Some 75 percent of the dispatcher tickets to trucks have a definite time of delivery—and they meet it.

Leasing of trucks has proved very satisfactory as there are no investment or maintenance problems involved, as the lessor checks the mechanical condition of each unit each week-end and makes replacements if



This shows a new system of shipping gypsum wallboard: a flat car is loaded with pallets and wrapped in waterproof paper (see below)



Here the car load is shown covered with the weather-resistant wrapping; this is paper with a special interlocking joint at the seams



Robert O. Mackrell, director of transportation, left, and William T. Davison, general traffic manager

necessary. Trucking was at first frowned on by the company, but it now feels that trucks are here to stay so it is wholeheartedly supporting their use. In the many new warehouses (which are huge and represent individual plant investments of half a million dollars or more) loading by and for trucks is provided for. Public relations, in one area, were improved by use of leased trucks. In another case contractors were doing a poor job, complaints rose and the contractors were replaced by leased trucks

and transportation returned to a satisfactory condition.

The distance hauled by trucks will vary with the plant location and the type of plant, and will range from mostly metropolitan traffic as in New York City to distances up to 350 miles in the case of some rock wool shipments. The company-owned, leased trucks, and most of the contractor's trucks are painted the company's colors of orange and buff with the words "Gold Bond" and National Gypsum Co. prominently displayed. Buff

and gold striping of the bumpers and lower part of the cab gives life to the paint job. There are 15 flat beds at the Baltimore plant of the type shown in the illustration.

Fork trucks are used in the 3000-lb. to 5-ton range and each plant has several available, both for intra-plant and warehouse transportation. Lift trucks in the 3-ton size seem to be a favorite although low lift and high lift platform trucks are available at some plants. The New York (Bronx) plant has between 15-20 fork trucks.

A PLANNED PROGRAM TO BENEFIT LABOR

Company's record with respect to labor grievances far better than average; pension and welfare plans provided for job security

MANAGEMENT AND THE MAN on the job must be brought closer together.

That is the key to National Gypsum Co.'s approach to the every-day problems of labor relations. That is why, in our organization, these problems are handled where they properly belong—on the job, in the plant.

In recent meetings of management associations and in the writings of human relations experts from many leading schools around the country, emphasis has been placed on the so-called "democratic approach" to management-labor affairs. It is interesting, we think, that this approach has been the accepted policy of our company throughout its twenty-five year history. Principally, it has been accepted because it was in the nature of our founders and production executives to live and work that way. Perhaps unconsciously, these men anticipated the "modern theory" because it was natural for them to work together with the men in the organization, to deal with them openly and fairly, and to treat them not as opponents in a fight between capital and labor but as co-workers for mutual prosperity.

This natural attitude on the part of the management of National Gypsum Co. over the years, has been translated into a clearly drawn policy for the conduct of labor relations. In brief, it is this: We realize that sound company-employee relations are essential to the successful operation of our plants—not solely to prevent labor disputes but principally to develop a smooth working team that will maintain unbroken production of high quality building materials in the most efficient manner.

Management-Labor Relations

In practice this policy means that the responsibility for building good

By **CHARLES H. DWYER**

labor relations is a man-to-man assignment that can be carried out only in the plant, on the job.

In the early days of our company's history, this attitude found its expression in the closest association between management and the men in the plants. As long as we were a small but growing outfit, top executives were able to spend a great deal of time at our plants, personally involved in the day-to-day job of getting new plants and machinery into production. They dealt with most of the workers individually and developed an understanding of their problems, both on and off the job.

Unfortunately, as the company grew larger, our principal executives were able to spend less and less time in these personal contacts. However, even today, they take advantage of every opportunity to get closer to the men in the plants. President Baker visits every plant at least once a year and takes part in as many special events, such as award dinners, employee picnics, and so on as his schedule will allow. Vice-President in Charge of Operations Lewis R. Sanderson and General Production Manager Fred A. Manske make regular trips to all plants and make it a point to find time to talk with several employees. Mr. Sanderson during the past year has written several letters to all employees, discussing particular matters as they have arisen and acquainting the men with the company's policies and plans.

These activities are important in revealing the consistency of our policy of bringing men and management closer together. However, in our organization, the real responsibility for



Charles H. Dwyer, director of labor relations

developing and maintaining good employee relations in each plant rests with the plant manager. He is trained to recognize that the overall production goal set for his plant can be achieved only if he establishes complete cooperation with the supervisory force and the men on the job. He must establish an atmosphere in which the individuality of each employee is recognized at the same time that fair and impartial treatment is guaranteed to all employees.

On this foundation of close association with the individual worker, each plant manager and the company management as a whole have built a sound attitude towards unions. It is our belief that when a good relationship exists between the company and individual employees, relationships with the unions representing the men can be handled in a friendly and reasonable manner.

In another article in these pages, the program we have developed to

help our supervisors "get along" with their men is explained in detail. It is sufficient to emphasize here our conviction that the ability of foremen and supervisors to create an atmosphere in which all employees can work together happily and productively is the keystone of our whole labor relations structure.

Unions—Negotiations

In dealing with the unions representing our employees, the company has set a realistic approach to guide plant managers. In the first place, we have always recognized the right of a union to represent employees for bargaining purposes. In turn, we insist on the right to maintain the continued operation of our business without union interference. Our officials at all levels always will deal with union representatives openly, honestly, and on a friendly basis. At the same time, we expect the union officials to work with us cooperatively for benefit of the company and its employees.

Within the framework of this policy, today, we are dealing with 21 locals representing 11 different international unions. At each plant, the manager is responsible for negotiating in good faith with the local committee and for making an honest effort to comply with the spirit as well as the letter of any contract agreed upon.

In handling contract negotiations with the union representing the employees of his plant, each manager must first prepare himself by a thorough study of the questions to be discussed. This preparation normally should include a wage survey covering industry and area rates, standard practices in such matters as pay for holidays and vacations, overtime and shift premiums and data on the cost of living in the community. It should also include an analysis of the union involved and the adequacy of the local labor supply. Finally, to complete his preparatory studies, the manager should consult with his supervisory staff to determine their attitude toward the problems involved in the negotiations and to get their ideas on what changes should be made in the contract for more efficient operations.

Once his preliminary studies have been completed, the plant manager preparing to negotiate a contract with the local in his plant must develop recommendations for contract changes and adjustments in wage rates and submit them to management in the Buffalo office for review. Armed with the results of his studies and with the reactions of management to his recommendations, the plant manager is prepared to negotiate fairly, intelligently, and with authority. He is prepared to deal with local representatives of his employees, to discuss local problems and to cooperate in determining solutions to fit local conditions. At the same time, he is aware of the restrictions imposed on him by company-wide policies and circumstances.



When the company offered employees a new pension and insurance "package" early this year, negotiations for its acceptance were carried on with the union at each plant. President Baker, center, OK's the plan as presented to Local 88 of United Cement, Lime, and Gypsum Workers, A. F. of L., at the Portsmouth, N. H. plant

In the actual negotiations, our plant managers are not limited by any set rules except the injunction that they must be determined to arrive at a satisfactory, workable agreement. Using his own judgment and consulting with his supervisors, the manager is responsible for handling of all negotiations. He is directly assisted by his personnel supervisor who attends all meetings with him and by other supervisors as needed.

In carrying out all of these responsibilities, the plant manager also is assisted by the Labor Relations Department in Buffalo. It provides technical assistance in the preparation for negotiations, planning surveys and helping to gather and analyze information. When the plant manager is faced with difficult negotiations or when technical and legal problems are likely to come up in negotiations, department personnel are available to sit in with him during discussions with the union.

Once a contract has been successfully negotiated, the plant manager must insure that it is studied and understood by his supervisors and he must be ready to assist the union in educating plant workers in its terms. What's more, he must see to it that both supervisors and employees comply with its terms, always guarding against strictly legalistic interpretations. It is his job to work under the contract in a clear and common sense manner, with reasonable flexibility and fairness in handling plant problems within the intent of the agreement.

Grievance Procedure

Of particular interest, we think, in showing the way our policy of man-to-man dealings between employees and the company blends with the more

formal requirements of negotiated contracts is our handling of employee grievances. Basically, we believe that these upsets in the smooth operation of our plants can be held to a minimum when a mutual respect exists between the foreman and his men. Petty complaints which develop into real grievances are avoided, as much as possible, by instilling real cooperation in our working force. However, when honest differences of opinion arise or when imaginary complaints get out of hand, we endeavor to settle them at the lowest possible level.

Our foremen are educated to understand that they must receive all complaints with an open mind. If the employee involved has a justifiable grievance he is entitled to prompt and satisfactory treatment. If, after listening carefully and with understanding the foreman feels that the employee is not justified, he explains the situation and tries to find out where the difficulty arose. If the foreman has any question remaining in his mind concerning the grievance, he consults with his immediate supervisor.

In deciding on his course of action, the foreman must make a sincere effort to get all the facts. He gives the employee a chance to talk himself out, thereby sometimes settling the whole problem. However, if after getting all the facts and consulting with his supervisor, the foreman is unable to satisfy the employee, it is his duty to advise the employee to follow the grievance procedure outlined in the contract. While this procedure may vary from plant to plant it normally includes an attempt by the plant manager to handle the matter with union representatives and, if this fails, further discussions with a Labor Rela-

tions Department man and representative of the International Union present. Finally, if a solution to the grievance is not found in this way, resort may be taken to arbitration. In some contracts, arbitration of grievances is called for in all such instances.

Welfare Program

Another illustration of the company's approach to labor relations as a man-to-management, on-the-job problem can be found in the recent development of a new employee welfare program. Early in 1950, after several months of study, the company developed a pension plan and an insurance package for hourly workers. The pension plan, at no cost to the employee, provides a minimum pension of \$100 a month for employees with 25 or more years service on retirement at the age of 65. The insurance package, the cost of which is to be shared equally between the company and the employee, includes life insurance benefits, accidental death and disability benefits, weekly sick and accident payments, hospitalization and surgical insurance, and maternity benefits for female employees and wives of employees.

This entire program was submitted to the employees of each plant at the time of the regular contract renegotiations meetings. However, in keeping with our established policy, the proposal was a matter for negotiation and it had to be viewed in the light of local conditions and the circumstances of the men in each plant. As a result, the complete plan was made part of the agreement for eight plants and the insurance package alone was adopted in six others. In the remaining plants, the local situation led to the adoption of other terms.

We are realists, of course, to recognize that such a program for labor-management relations as ours must be built on a solid foundation of fair dealing in such matters as wages, hours of work, promotion, and job security. It is the company's policy for example, to pay every employee a fair wage for work performed. In figuring out the rates that should apply to all jobs in his plant, the manager gives careful consideration to rates paid by competing firms in the vicinity. If competition has no plants in the area, our plant manager checks up on rates paid for similar work by other employers in the community. After this study and

bearing in mind other important factors such as the cost of living, rates paid by the company in other plants, the availability of labor, and employee morale, the manager attempts to set up a wage scale that is equal to or better than that paid for similar jobs in the area.

The same care and judgment must be exercised by plant managers in arranging such matters as working hours and shift changes and in selecting employees for promotion.

The policies and procedures we have discussed have been developed over the years as we have tried to implement our conviction that sound labor relations are essential to the successful operation of our plants. They are designed to keep management and employees working together for a common purpose—the production of high quality building materials at a reasonable price and in a quantity that will meet the demand. As we see it, if either management or labor forgets this basic purpose or does anything to defeat it, both will suffer. For that reason we have directed our efforts to bringing men and management closer together.

TRAINING IN HUMAN RELATIONS GIVEN TO SUPERVISORS

Company's policy in relation to workers based on supervisory training through a course in human relations and a course on company's methods of operation; incentive system stimulates better plant management

By F. A. MANSKE*

DURING THE YEARS immediately following World War II, National Gypsum spent more than \$38,000,000 to build new plants and modernize old ones. We went all out to find or develop the most practical, modern equipment to make our plants technically the most efficient in the industry. We brought together the engineering and production "know-how" that our company had acquired over the years and applied it to the problems created by the new postwar conditions. As a result we doubled our productive capacities and built a new high in efficiency into our plants.

The same kind of concentrated effort was put into modernizing our distribution and marketing methods after the war. In our offices, too, we studied and improved the methods in handling our administrative details. Throughout the organization, we did everything possible to improve our equipment and our mechanical processes. However, in line with National's long-established policy, we did not neglect the human element.

It always has been a guiding

principle of our management to deal with our employees as individuals, not

as "workers." We always have recognized the importance of the day-to-day relationship between man and management—importance to both the company and the people who work



F. A. Manske, right, general production manager, explains details of the company's plant rating system to E. B. Hollingsworth and E. W. Odenwald, production managers. Mr. Manske is holding the sign used to introduce the system to plant supervisors.

*General production manager.



Left: A screen from one of the sound slide films used in the company's training course for supervisors; this drawing emphasizes the "man-to-management" relationship which is the foundation for company's labor relations program. Right: This cartoon from another training film dramatizes the idea that a man's personal worries many times affect his job performance—a fact that supervisors are instructed to take into consideration

with us. Consequently, when we enlarged and modernized our productive capacities we were well aware that we would have to see to it that our handling of human relations kept pace.

As a result of this determination when our plant expansion program was nearing completion, President Baker and Mr. Sanderson, vice-president in charge of operations, directed us to study ways and means of implementing our company's announced policies to meet the changed circumstances. In carrying out these instructions we kept in mind at all times the fact that our goals were (1) to maintain an organization that would produce high quality materials in the most efficient manner possible and (2) to uphold National's reputation as a good place to work. At the same time, we held to the basic proposition that the place to carry out such a program was on the job, in the plant, where the individual man actually comes in contact with management.

This, in effect, put the spotlight of our attention on the supervisors who represent management in the day-to-day association with the men. As a result, we proposed and management adopted a two-part program designed to prepare supervisors at all levels to develop an effective working organization through a better understanding of human relations. Secondly, we proposed and management adopted a system of rating and awards as an incentive to better overall management in the plants.

Training Program

The two-part program for supervisory training was developed and administered by Charles H. Dwyer, labor relations director. It is made up of (1) a course in human relations and (2) a course in company history, policies, products and future prospects. These two courses are conducted simultaneously in bi-weekly meetings of the manager and all supervisors at each plant.

The human relations course that we used was developed with "Human Relations for Industry," a Buffalo,

N. Y., organization specializing in preparing sound-slide films for industrial training. The material presented in the films was based on industrial studies by Dr. Nathaniel Cantor, an outstanding educator and sociologist, who also assisted us in getting the program underway in our plants.

According to Dr. Cantor's plan of presentation, each film in the series was presented to our supervisors at one of the bi-weekly meetings and was followed by a discussion of the principles and problems involved and their application to conditions in the plant.

The first step in the program was the selection and training of a man at each plant who could serve as discussion leader. In most instances, the safety supervisor at the plant was chosen because of his background in this type of study and because of his experience in conducting other training courses. Those selected were brought together in our Buffalo headquarters for a week of intensified study of the methods of discussion leadership and for an introduction to the elements of the human relations course from Dr. Cantor.

The course as a whole is aimed at helping supervisors understand themselves and their employees. It is based on the belief that if they can understand their own needs and will recognize similar needs in their men, they will understand the basis and nature of many employees' complaints.

While participating in the discussions based on the films, the supervisor is helped to realize that employees working together on a job are not only producing goods. They are engaging in informal social activity as well. They are seeking prestige, status, esteem, and social success. They want to count and to feel proud of their work. What's more, the men want to know what is going on and they definitely do not want to be pushed around arbitrarily.

The course is divided into several parts, each of which builds upon the material presented previously. Part I helps the supervisor understand himself, his motivations, what makes him

tick. In Part II, he finds that the men he works with are motivated in the same ways. Now he is ready to appreciate the nature of employees' problems and complaints as explained in Part III.

Once the supervisor understands his employees' problems, he must have the effective skills necessary to help settle them. These are described in Part IV. Then he is prepared for an analysis of his responsibilities in supervision as outlined in Part V.

In Part VI, he is given an overall view of industry as a social system, where all kinds of people with different status and prestige are associating with each other. Finally, Part VII brings together all these aspects of human relations and puts the problem of understanding employees into general perspective.

Simultaneously with the presentation of the human relations course, we attempted to make our supervisors thoroughly familiar with our company's story. In a series of specially prepared sound slide films, we acquainted them with the facts of National Gypsum's growth and we outlined our policies on such matters as labor relations, sales, research, promotions, and job security. We also gave them the fundamentals of our program of on-the-job training and emphasized their responsibilities in all of these matters. In effect, this series of films provided our supervisors with an understanding of the tools available to them in their job of dealing with their men while the human relations series gave them an understanding of how to use the tools.

Just as we have emphasized the importance of the supervisor in our operations by stressing the part he plays in our man-to-management relations with our employees, we also determined to recognize and reward his contribution to the overall successful conduct of our business. To this end, we have adopted a system of plant ratings based upon performances as set against established standards.

Standards for Operation

National Gypsum has always maintained that meeting standards is an accepted part of the responsibility undertaken by plant managers and supervisors. However, we never have been satisfied with merely meeting standards. The company's growth and its many achievements, we are sure, would never have been possible if the men responsible had not made extraordinary efforts to surpass set goals. To recognize such efforts in the future and to encourage the participation of key personnel in our new programs, our management, with the authorization of the board of directors, determined to reward the managers and supervisors whose plant ratings showed the result of exceptional work.

The mechanics of the plan are simple enough. At the start of each year, and after careful consideration of all

the elements involved, standards are set for each plant covering the following factors: costs, quality, house-keeping, labor relations, safety, public relations, and service. These standards are arrived at after consultation with the concurrence of the plant manager and his staff. These matters are emphasized in all management planning and are carefully tied into the supervisory training program.

The key element among these standards, of course, is the one labeled costs. However, the relationship between costs and each of the other elements is obvious. Lack of attention to labor relations, for example, can result in inefficiency and thus high costs and an unfavorable variance from the standard. Thus, the failure of supervisors to absorb the principles brought out in the human relations discussions may be reflected in the emer-

gence of a costly labor relations problem that will affect the plant rating.

Clearly, then, it is possible to combine a statistical analysis of plant costs with a more subjective analysis of such matters as labor relations, public relations and service, and come up with a rating of the efforts made at a given plant to excel in all elements of our rating system. Clearly, too, it is appropriate to use favorable variations from cost standards as a basis for rewarding extraordinary effort by bonus payments.

This is the basis for the system we have adopted at National. Each month, we compute the favorable or unfavorable variances from cost standards for each plant. At the end of the year, these are summarized and if a net favorable balance results, a percentage of the balance is set aside as a bonus account for the plant.

Next, each plant is rated on the other listed elements by company operating executives. If, and only if, established standards for these factors have been exceeded, the bonus account becomes available for distribution to the plant manager and supervisory staff.

The results that we have obtained from the combination of the two programs we have described here have more than justified our reasoning. We know now, better than ever before, that our supervisors, properly trained, adequately rewarded, and supervised with consideration are the best guarantee that we will attain the goals we have set for ourselves. They can uphold National Gypsum's reputation as a good place to work and they can provide us with an organization capable of producing high quality materials in the most efficient manner.

RECORD PROVES SOUNDNESS OF SAFETY PROGRAM

Since safety department was formed accident frequency has declined each year. Reduction in 14 years has been 73 percent; severity rate down 70 percent

By M. C. M. POLLARD

AT NATIONAL GYPSUM'S QUARRY at National City, Mich., the crew has worked for 12 consecutive years without a single lost-time accident. At Bellefonte, Penn., the workers in our mine this year received the U. S. Bureau of Mines Sentinels of Safety trophy for achieving top honors in the national safety competition in 1949. These are only two of many current examples that prove that workers in National Gypsum plants are safety conscious.

During the past thirteen years, in the company as a whole, our lost-time injury rate has been reduced 73 percent while the injury severity rate has dropped 70 percent. At the present time, there are only 39 cases requiring medical attention for each million man-hours worked in our plants. Of these, only nine are lost-time injuries. This continuing reduction in our accident rate has resulted in current savings at the rate of \$100,000 a year. These savings are computed by comparing standard industrial insurance premiums with the actual costs carried by our company.

Every man and woman in our organization is proud of that record. And well they might be, because they made it possible by their own determination to avoid painful, costly injuries and to eliminate the conditions that cause them. They know full well that "safety is no accident."

Safety's Role in Efficiency

The determination of our employees to work safely is backed by the firm

conviction of our management that efficient operation can be furthered by the prevention of accidents. The expressed policy of the company is that "our safety efforts are based on the premise that there is an inseparable relationship between safety and efficient production and that the same methods of control that apply to the quality and quantity of production are applicable to accident prevention."

Thus, at National Gypsum, safety is both a human and a dollars-and-cents problem. We believe that we are organized to meet it. Responsibility for safety in our organization passes from the president, through the office of the vice-president in charge of operations to the general production manager and down to each plant manager. He in turn looks to his department heads and supervisors for results. Ultimately then, responsibility rests on the job with the foreman in charge and the men who work with him.

To advise and assist the men on the job in carrying out their responsibility, the director of safety, working out of our Buffalo headquarters, provides training and technical safety information. In addition, each plant manager is assisted by a safety supervisor to whom he delegates the job of overseeing the safety program in the plant. These staff men act as the direct representatives of man-



Merrill C. M. Pollard, safety director

agement in all matters pertaining to safety. In addition to keeping complete records covering the causes and frequency of accidents within the company and in similar operations, they work constantly with the supervisors, acquainting them with the principles of accident prevention and with methods that have been proven under comparable working conditions.

Applying the policy that the same methods of control that are used in other phases of production can be fitted to accident prevention, National Gypsum every year prepares a "safety budget." This "budget" is not a

measure of the money to be spent on accident prevention during the year but it is a definite goal toward which each plant must work. The objectives are not arbitrarily arrived at on paper but they are set after full consultation with production men in each plant who are familiar with the full scope of the working program for the months ahead. For example, in 1949 these experts considered the company's production schedule, the condition of machinery and equipment in our mines, quarries, plants, and offices, and the ability and training of our employees. Out of this study they determined that we should be able to effect a 35 percent reduction in the number of accidents that year. In practice this goal actually was bettered and the 1949 record served as the basis for figuring the "safety budget" for 1950. Considering the same elements, production supervisors determined that the company, in its 25th anniversary year, could effect a 25 percent reduction of the '49 rate. As this is being written, we are assured of at least meeting this objective. Incidentally, it should be pointed out that ability to meet the standards set in the "safety budget" is one of the elements considered in National's plant efficiency rating system.

To meet the goals set in the "safety budget," each manager must maintain all plant grounds, buildings, machinery and equipment in a safe, clean, and orderly condition. He must see to it that the necessary equipment is provided to protect employees from occupational accidents and diseases and he must guard against unsafe physical conditions and production methods.

Factors in Control

In carrying out these responsibilities, he is supported by his safety supervisor and his entire supervisory staff and also by the plant safety committee on which the employees themselves are represented. What's more, he is greatly assisted by the ideas and suggestions submitted by all employees. These joint efforts are designed to achieve maximum safety by control of four principal factors:

1. Men
2. Machinery and safety equipment
3. Material
4. Housekeeping

In many ways, of course, efforts to control these factors are bound to overlap but that only has the effect of making the program more effective.

Control of men for safety purposes involves three important elements. First of all, the physical condition of workers in our plants is of prime importance. Only men in satisfactory condition, as shown in an examination by the plant physician, are employed. Further examinations of employees are called for whenever warranted by circumstances.

All employees are expected to be in satisfactory physical condition when reporting for work. In case an em-



Presentation of Sentinals of Safety trophy by Dr. James Boyd, director, Bureau of Mines, left

ployee shows up obviously unfit for work, he is sent home for his own and his fellow workers' good. In this same connection, all employees are trained to report all injuries, however slight, to their supervisors for treatment. Trained personnel are available at all times at the department first-aid station and at the plant first-aid room. In addition, more serious cases can be referred to the plant physician.

The second element in the control of men to insure safe operations involves training. In our plants, again, safety training is an on-the-job assignment. Supervisors and foremen are indoctrinated in the necessity for and the methods of teaching their men to work safely. This training begins the first day a man comes with the company so that he learns the safe way of doing his job right from the start. In addition, our policy calls for continuous education of all workers in safety rules and practices and in first aid.

The third element involved in controlling men for safety reasons is discipline. In each plant, clearly drawn safety rules are published and carefully explained to all employees. For infractions of these rules, published penalties are imposed. In all instances where penalties are invoked, the manager sees to it that the union is informed as to the circumstances.

Factor number two that must be controlled in our plants in order to achieve maximum safety is machinery and special equipment. To begin with, all new machinery and equipment is engineered or purchased with all practicable safeguards incorporated at the time of installation. Furthermore, regular inspections are made to improve existing safety devices or to determine the necessity for additional safeguards. Plant-to-plant exchange of ideas insures that the best experience of every plant is incorporated into the machinery and equipment of all plants.

Next, plant managers and their staffs maintain close control of all materials used in manufacture in order to minimize risk. Research works constantly to make these materials as non-hazardous as possible and recom-

mendations for protection of workers from any dangers that may be involved are passed on to the plants by the production department.

Finally, control must be maintained over a fourth factor—housekeeping—before conditions can be conducive to maximum safety. The old saw, "a place for everything and everything in its place" is the basis for this control and workers, foremen and department heads are all impressed with its importance. Careful study is made to insure that storage is handled properly, that lighting is adequate and satisfactorily located, and aisles are available where needed. Once this planning is done, all men in the plant are educated in good housekeeping. Every individual is responsible to see that his surroundings are clean and orderly.

The effectiveness of these controls depends, of course, on the wholehearted participation of all personnel in the plant. To this end, we have adopted an accident prevention program that assigns duties and responsibilities all along the line. Heading the program, of course, is the plant manager whose primary duty it is to instill in all personnel our conviction that accident prevention is a definite part of day-to-day operational procedure. This means that he must deal intimately with every aspect of safety and safety training.

Responsibility for Safety

To begin with, the plant manager incorporates discussion of the plant's safety activities in regular foremen's meetings and keeps close contact with conditions in each department by constant checking with supervisors in charge. With data gained in this way plus the information presented in the inspection reports prepared by his safety supervisor, the manager discusses the plant's safety question-marks with the safety committee and with them plans to find the answers. He also consults regularly on the application of the accident prevention program with a representative of the Casualty Insurance Co. In addition, he checks accident investigation reports and handles all violations of safety rules requiring discipline.

Under this immediate, overall supervision by the plant manager, each foreman accepts responsibility for curtailing accidents in his own operations. He begins by careful training of his men in safe working practices, job hazards, and safety rules. He carries on by thorough-going checks on his department's condition, noting the condition of machinery, equipment, and tools. He also keeps close tabs on the physical condition of his men and watches their observance of the rules of good housekeeping.

To insure that the foreman carries out these responsibilities without stinting, he is required to make a daily check of his employee's working practices and a weekly inspection of his department in the company of

the safety supervisor. Finally, he profits from regular attendance at all safety meetings and from the personal training he receives in accident prevention from the safety supervisor and the plant manager.

Serving as the principal arm of the plant manager and the chief aide of all foremen in accident prevention is the safety supervisor. He is responsible for handling the administrative details of the program, for the maintenance of records, for comparative studies of operations in all departments and in similar plants, and for the conduct of regularly scheduled inspections.

Once each week, the safety supervisor inspects every department in the plant in the company of the department head. Once each month, he checks over the entire plant with the Casualty Insurance Co. engineer. These inspections are based on the problems pointed out by the engineer on previous visits and on the observations of the plant manager, the supervisors, and the safety committee. Following each check-up, the safety supervisor submits a detailed report

to the plant manager indicating problems noted, as well as unsafe conditions and acts that were observed.

Supporting all of these management efforts is the foundation-stone of our successful conduct of an accident prevention program, the plant safety committee. Here we have organized participation in safety activities by all groups within the plant, insuring the widest possible dissemination of information and the broadest possible discussion of problems and suggestions.

The plant safety committee is composed of the plant manager, the safety supervisor, acting as chairman, all foremen, and three or more representatives of the employees. The committee meets once each month to discuss and recommend action on the outstanding accident problems indicated by inspections, recommendations of employees, and all other sources. In addition, it reviews educational material distributed by the safety director and plans its proper use in the plant.

A typical meeting of a plant safety committee gets underway with a re-

port by the plant manager on action taken as a result of suggestions made during the previous meeting. Next the safety supervisor announces the latest summary of accident figures and reports on the plant inspections. Following this, the Casualty Insurance Co. engineer discusses the problems noted on the inspections and gives his suggestions on how to remedy any deficiencies. Finally, the committee discusses the pressing problems reported and recommends action to be taken before the next meeting.

With this organized program of accident prevention involving all personnel in the plant, we at National believe that we are prepared to carry out the company policy of making safety a regular part of efficient plant operation. By enlisting the active participation of all employees, we carry out the conviction that safety must begin on the job, in the plant. By setting up a "safety budget" for each plant and plant manager, we insure that the same methods of control that apply to the quality and quantity of production are applied to accident prevention.

DEALER ORGANIZATION THE FOUNDATION FOR SALES

Company has 15,000 dealers for building products whose efforts are supported by consistent advertising and technically trained sales personnel

IN EVERY NATIONAL GYPSUM CO. PLANT and office and on the wall behind the general production manager's desk, you can find a cartoon-sign bearing the legend—THE CUSTOMER IS BOSS.

This poster is just one of the many reminders that every National employee is a part of the company's selling organization. Production workers, clerks, stenographers and executives never are allowed to forget that it is their job to make a product equal to or better than the best at no higher cost and to give the customer the service he needs. As President M. H. Baker told them all recently, "If your job doesn't help us sell Gold Bond products, transfer to another department into a job that does."

This policy of 100 percent participation in the selling effort is much more than a mere morale builder. Principally, it is an expression of the company's basic conviction that its growth and prosperity is directly dependent on the constant improvement of its selling program—a conviction that took shape in the company's earliest days.

When National Gypsum started in business, it manufactured one product—gypsum wallboard—at one plant in western New York. The

By L. J. FITZPATRICK

founders of the company had built many features of quality and serviceability into this new wallboard but the problem of selling it was a serious challenge. In addition to meeting aggressive competition from older, entrenched manufacturers, National's salesmen had to break down a prejudice against gypsum wallboard that was widespread among reputable lumber dealers, builders, and contractors. Dealers who had developed responsible organizations to provide their communities with quality building materials resented the fact that certain producers of gypsum board were by-passing them and distributing through all kinds of retail outlets, even including drug stores and gas stations. At the same time, contractors and builders were finding that they could not rely on the quality of the product they were buying and that they could get little or no job service from the manufacturer.

Recognizing the situation that existed in the industry when National entered the field, Mr. Baker, the company's first director of sales, announced an aggressive new policy:



L. J. Fitzpatrick, director of advertising and public relations

"This business is run for the carpenter, contractor and dealer as surely as it is run for us. Every foot of wallboard we merchandise will pass through a bona fide dealer."

In practical terms, this general policy was expressed in three guarantees which National presented to the trade. The company undertook:

1. To produce a product that would be unquestionably the best
2. To maintain shipping facilities which would assure absolutely satisfactory service
3. To present to the dealer the clearest-cut, squarest money-making proposition and to carry out all promises both in the spirit and to the letter.

Finally, to demonstrate its sincerity in these undertakings, the company posted a \$5000 bond with which it challenged anyone to disprove any claim made for the product or the service offered.

Gaining Dealer Acceptance

Putting these policies into effect, National's first salesmen took the new wallboard into dealers' yards and onto the construction site. They presented convincing demonstrations of its strength, its flexibility, and its workability on the job. At the same time, they reassured reputable dealers by repeatedly turning down top-price cash offers for carloads of wallboard from other than bona-fide outlets.

As a result of those statements and the actions that proved them, dealers quickly came to accept National Gypsum's product. Soon, they began referring to National as "that Gold Bond company," a fact which led to the adoption of Gold Bond as the trade name for the new wallboard and all of the products later added to the line.

National Gypsum Co. has never forgotten the value of the support these first dealers gave the company in its formative years. In fact, the management early recognized the importance of this support and determined to repay it and, at the same time, capitalize on it in a way that was unique in the building materials industry. At a time when funds for advertising were hard to get, they purchased two



John W. Brown, general sales manager

full pages in a great, nationally distributed magazine and ran an advertisement which read something like this:

"We do not generally advertise in consumer-type magazines because we think it is unnecessary. Thousands of men all over the country have invested their money in dealerships to distribute building materials. When the consumer buys wallboard he very wisely buys the wallboard most widely endorsed by the lumber dealer in his community who, of course, is the qualified expert on building materials. National Gypsum Company's gypsum wallboard, because of its outstanding qualities, is generally endorsed by lumber dealers." Then followed a spread of one inch square photo-

graphs of many representative dealers with the name and address under each picture. Over the entire spread was the caption: "These are some of the qualified experts who have endorsed National Gypsum Company's gypsum wallboard."

Company Policy Unchanged

Needless to say, the dealers pictured in this ad and in the others that followed appreciated the recognition given to them and their business. What was even more significant, many other dealers, impressed by the way National supported its own, took an interest in the new company and soon joined the Gold Bond family. Incidentally, every ad the company runs in consumer publications today carries these words: "See your local Gold Bond dealer"—practical evidence that the company's policy has not changed over the years.

As soon as National's Gold Bond wallboard came to be accepted by the trade, the management began to broaden the company's activities according to a carefully thought-out plan that was designed to attract more business by providing more and better service. This plan, which has come to be known as "The Gold Bond Idea," provided an answer to a problem which long had vexed all elements of the building industry—architects, builders, and dealers alike—the problem of responsibility.

Twenty-five years ago, it was common practice in the industry to use the products of a half-dozen or more different manufacturers on the walls and ceilings of a single job. These materials were not made to go together and the defects of one could be blamed on another. They were not of uniform quality and often the deficiencies in one seriously weakened the other. As a result, no one manufacturer could be shouldered with the responsibility for the results.

The architect, preparing specifications for a job, could not look with certainty to any one line to meet every wall and ceiling requirement in the job he was planning. To the hundreds of headaches that haunt every construction site, contractors and builders were forced to add worry over who would assume responsibility for the materials used on walls and ceilings. And, equally important, the dealer, stocking his yard with varied items from various manufacturers, found his selling problems multiplied.

The Gold Bond Idea

To the management of National Gypsum Co., these unsatisfactory conditions presented a direct challenge. "Why should dealers, builders, architects and home-buyers be forced to rely on a patchwork of materials in walls and ceilings," they asked, "when one manufacturer could develop a complete line to fill all their needs?"

The answer was the Gold Bond Idea, the theme that has prompted National Gypsum's growth, the development of



Company exhibit at a National Association of Home Builders convention

its products and its selling program, as well as its service to the industry. Starting with gypsum wallboard, the company developed a line of related products, all sold under the same trade mark, all made to work together, all offered under the same guarantee of quality and performance. As a result, the building industry found that it could place responsibility for the efficiency of finished walls and ceilings in one manufacturer.

So, backed by a firm and fair dealer policy and supported by a logical plan for expansion and growth, the dealer organization which numbered about 200 in the first years of the company's history has grown to include 15,000 members. Serving them is a well-trained, experienced sales force.

Sales Organization

At the top of the sales organization, working directly under the president, is the vice-president in charge of sales, Dean D. Crandell. Combining a natural talent for salesmanship with a chemist's training and twenty-five years experience in research, Mr. Crandell is aware of the problems facing production as well as the requirements of the consumer. Consequently, his sales planning is realistic and practical. Every salesman knows that the goals set for him can be reached.

Under Randall, the sales organization is split into dealer and industrial groups. Industrial sales are headed by Amos Miner while general sales manager John W. Brown tops the dealer sales force. Assisting Mr. Brown are general commodity manager James J. Ryan and his staff of specialists who formulate and carry out plans to promote sales of the individual products. A commodity manager is responsible for the selling program for each of the following: gypsum board products, masonry supply products, insulation board products, rock wool, acoustical products, paint products, and metal products.

In carrying out this responsibility, each commodity manager advises and works with the director of advertising and the field force in promoting his product group. He keeps the necessary statistical records on the sales of his products and is up-to-date on competitive activities in the field. Also, it is his job to prepare the sales quotas and material allotments for the sales districts and to coordinate these plans with the production department.

The selling force in the field under Mr. Brown is organized into 17 districts, each headed by a district sales manager. He is responsible to Mr. Brown for supervision of all salesmen and the sales of all commodities in the districts. He prepares the necessary sales control records, interprets policies and advises salesmen on major problems. In addition, the district sales manager is called upon to keep up the broadest possible knowledge of conditions in his district and



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When should a fellow buy a house?

[illegible]

These facilities require low investment. Unlike facilities for the more complex and the capital-intensive advanced heat exchanger, these almost anything you can imagine. And look at number of the benefits you get:

- You can get maximum low investment for your

Fraxinus (the green ash) is a native tree, but it is not a kind of tropical gymnosperm. It is a deciduous tree that grows in temperate regions, and it is not native to the tropics.

Yes, we get better places with our nesting ducks in southern building projects. Instead of being under the second bath, builders now use our nesting yards of long-term grassland. Ducks are healthy and build their nests larger.

张其成：《张其成讲读：〈孟子〉人生智慧》，北京：中国书店，2006年。

總發行：廖正興 總編輯：廖正興 總經銷：廖正興
總發行所：廖正興 總發行所：廖正興 總發行所：廖正興



New consumer ad series, of which an example is shown above, stresses pride-of-ownership theme

must be in close personal contact with all active and prospective major accounts.

Next in line, of course, is the salesman, the direct contact between National and its dealer organization. At the present time, there are 345 salesmen, most of whom are general line men, handling the company's entire group of building materials. There are a few specialists who concentrate on such products as paint or rock wool.

In general, the salesman's job breaks down into two parts—direct selling, and service and merchandising. Direct selling includes his efforts to get an immediate order by contacts with a dealer, contractor or architect. Under National's plan of operation it may seem contradictory to include calls made on contractors or architects under the heading of "direct selling" because the salesman cannot sell anything to them "directly." All orders, under National's clearly established policy, must pass through an established dealer. However, the influence which the contractor and architect have over the choice

of materials for a job makes it important that they be "sold" on the Gold Bond Idea.

In selling the dealer, a Gold Bond salesman may have one or more objectives in mind. He may simply be after orders for products that the dealer already carries or he may be after orders for other products the dealer has not stocked in the past. It may be his objective to set up a new Gold Bond account or he may be after a dealer to become a key account on a specific product such as metal bath.

To accomplish any of these objectives, the salesman must first of all acquire a complete understanding of the dealer's business. He must be able to show the dealer how he can increase his business by selling Gold Bond Products.

Salesmen's Functions

Over and beyond his efforts in direct selling, the successful salesman must "live" with those who buy or control the use of his products. Through close association and study, he must learn how to help his customers in many ways not concerned

with an immediate order but affecting the future course of business. This help generally is described as service and merchandising.

In assisting the dealer, a Gold Bond salesman enters into many fields of sales promotion and servicing of the account. He may build or suggest displays and develop advertising programs that will help move Gold Bond products from the dealer to the consumer. He may suggest ways and means whereby the dealer can streamline his operations and cut costs, such as better ways to store materials or better handling methods. He may, in fact he should, assist in training the dealer's salesmen and his yard crew. He organizes and maintains the dealer's supplies of samples and literature on National's products and he keeps the dealer informed on Gold Bond advertising. Finally, he provides such direct assistance as organizing price data for the dealer, helping him select the suitable materials to meet specific requirements, and actually selling large jobs with him.

At the same time, a salesman must be prepared to offer extra services to contractors, architects, builders, and owners in his territory. All Gold Bond salesmen are taught, for example, that a contractor's major interest is in reducing his job costs. He, therefore, is constantly watching for opportunities of showing contractors he works with how to cut costs by using specific materials or construction systems. He also helps by instructing the contractor and his crews in the approved methods of applica-

tion of Gold Bond products so as to guarantee full value. In a similar way, he attempts to provide information and services that will help architects and others carry out their functions in the building industry.

To support the sales force in its efforts to serve our dealers, the company engages in a million-dollar-a-year advertising program. Generally speaking, this campaign is divided into three parts—consumer advertising, trade advertising, and dealers' aids.

Advertising

In the consumer field we have for several years concentrated on a series of full-page, full-color ads in the *Saturday Evening Post*. Each of these ads has featured an attractive illustration of a new, modern American home or a specially designed interior setting. Tied in with this art-work was the story of Gold Bond products and how they can be used in building the home or in decorating the interior shown. Always, the ad closed with the message "See your local Gold Bond dealer."

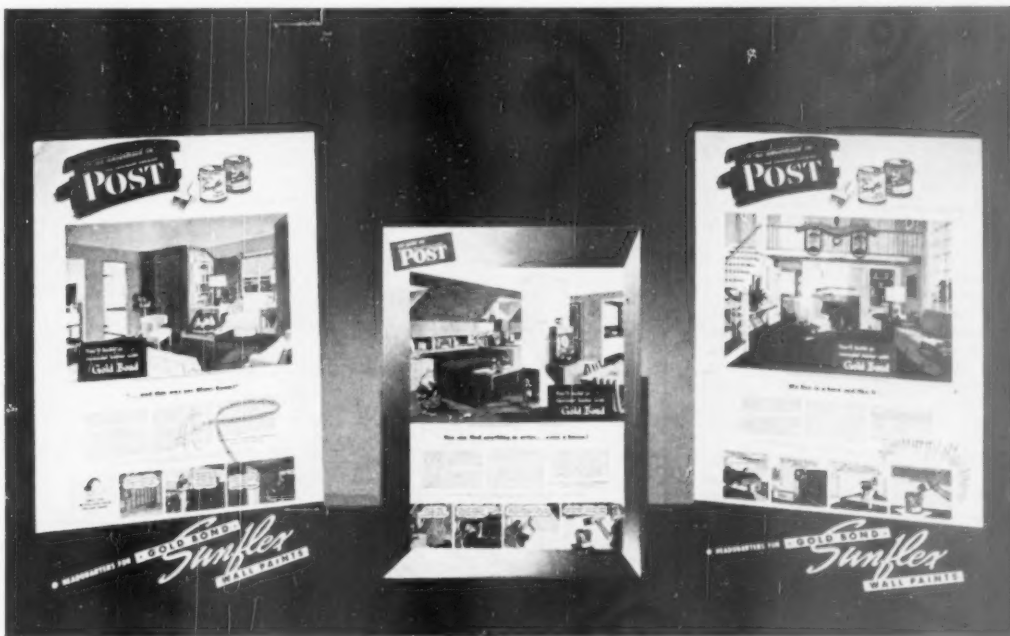
Recently, however, this *Post* series has undergone a major revision. As a result of the recent changes in the outlook for the residential building industry, we believed that the time had come to use our ads to sell the idea of home ownership. Beginning with the most recent issues of the *Post*, we have undertaken to do an overall advertising job for the building industry on the pride-of-ownership theme. In these ads, our own

products get "second billing" because we realize that unless interest in home-buying on the part of the general public is kept high, the use of our products will drop off materially. On the other hand, it is clear to us that if enough homes are built we will be able to get our share of the market.

In our trade advertising, we direct our appeals to each of the several groups making up the building industry—dealers, architects, builders, contractors, skilled craftsmen, and so on. In these ads, we concentrate on the use and performance of specific products or construction systems that we advocate. In every instance, we attempt to prove the practical, dollars and cents value of our materials.

Finally, in supporting our dealers throughout the country, we provide them with a wide variety of advertising material designed to add strength to their merchandising. This material includes displays, posters, signs, descriptive literature, samples, and dozens of other items.

The sales organization that we have discussed, from the president and vice-president all along the line to the dealer and his staff, is preparing now for a changing market. Business analysts generally anticipate a substantial falling off in residential construction in the months ahead. This, however, does not frighten our outfit. Instead, we are readying ourselves for the competitive fight that is sure to come. We are looking forward to it with confidence in our products, in our ability to sell them, and in our dealers.



Series of full page colored ads has been run in the "Saturday Evening Post," showing an attractive home or interior

Crushing

Crushing Practice and Theory

Part V. Gyratory reduction crushers—types and characteristics

IN A PRECEDING article we covered briefly the development of various types of reduction crushers of the gyratory family. Fig. 4 shows a modern gyratory reduction crusher, which introduced the cylindrical top shell, flared head, and reversible concaves. Even with the older style of straight concaves, with which this machine was originally fitted, it represented a distinct step forward in secondary crusher design, and the later introduction of non-choking concaves increased its efficiency and permitted the use of finer settings than were originally allowable. This type of machine, although it has been superseded in the fine-reduction field by more efficient types, still rates as a very excellent crusher for secondary work. It has good capacity at moderate settings, is ruggedly constructed, and has, for comparable sizes, relatively large receiving openings, as compared to machines designed primarily for fine-reduction work.

To show why this machine was a distinct step forward in secondary crusher design, it is interesting to compare the action of its crushing chamber to the standard crusher chambers already described. And to make clear the fact that the machine had certain advanced features, even before non-choking concaves were developed, we first show a diagram of its crushing chamber with the older type of beveled, straight-face concaves (Fig. 5). It should be mentioned that these beveled concaves were not the very earliest type used in this crusher; they were preceded by plain, straight concaves, which utilized the full rated receiving opening of the crusher, but had the same disadvantage we noted in connection with this type, as used in the standard gyratory—concentration of wear at the discharge-point. The beveled type spread the wear out somewhat, although at the cost of some reduction in the effective receiving opening.

The distinctive feature of the design shown in Fig. 5 is the decided slope of the line-of-mean-diameters away from the center-line of the crusher, as this line runs down through the crushing chamber. As the volumes of the successive rings of material are functions of their diameters, as well as their areas, it

By BROWNELL MCGREW*

is apparent that these progressively increasing diameters tend to offset the decreasing areas; in other words, the flared head spreads the material as it moves downward, thereby tending to minimize the ratio-of-volume-reduction. The actual compression-ratio in this chamber is about 1.5:1, which is lower than in either of the diagrams previously discussed—and very much lower than the case of the standard crusher with straight concaves.

That this departure from the older conventional design was a decided improvement for secondary crushing is apparent when we compare two machines of approximately equal head diameters, a logical comparison because the diameter of the bottom of the crushing head directly affects the area of discharge opening and, hence, the capacity of the crusher. The Superior McCully 10-in. reduction crusher, with its 40-in. head, compares closely, in this respect, with the 20-in. standard crusher, which has a 38-in. head. Using straight-face concaves, the permissible minimum open-

side settings are $1\frac{1}{2}$ in. for the former, and $3\frac{1}{4}$ in. for the latter. With non-choking concaves these settings are, respectively, $1\frac{1}{4}$ in. and $2\frac{1}{4}$ in.

Non-Choking Concaves

To show the characteristics of this type of crusher when fitted with non-choking concaves we have prepared a diagram of the same size machine so equipped (Fig. 6). We now have the cumulative benefits of the flared head and curved-profile liners. There is a marked reduction in the number of strokes required to shift plane "O" down to the discharge level; the choke-point has been raised, and the ratio of volume reduction is lower (about 1.2:1).

There is a decrease in the effective receiving opening, as compared with the straight-face chamber, when using "full-curve," non-choking concaves, which is the type shown in our diagram. This effective opening is established by the maximum angle of nip; therefore it varies somewhat for different materials, and in different sizes of crusher. For this crusher 26 deg. was chosen as the governing angle; about 28 deg. is the conservative maxi-

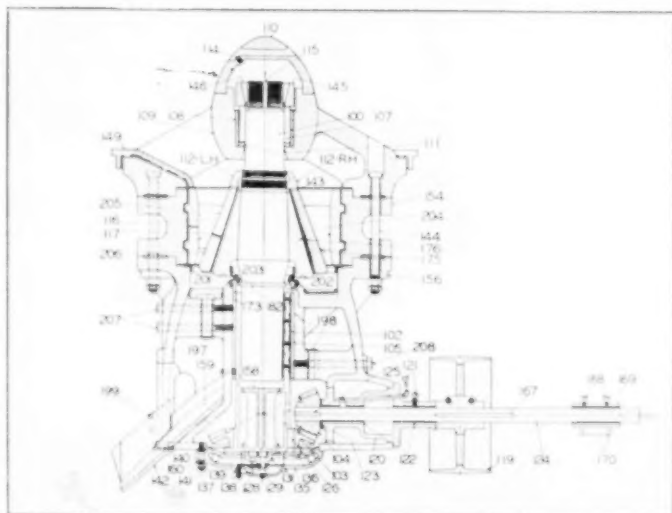


Fig. 4. Sectional view of fine reduction crusher

*Allis-Chalmers Manufacturing Co., Los Angeles, Calif., district office.

CRUSHING

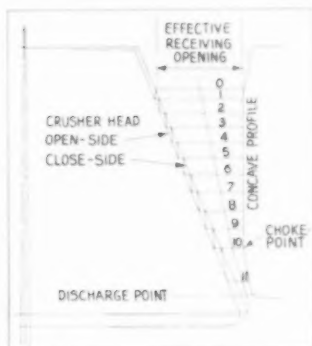


Fig. 5: Reduction crusher—beveled straight-face concaves

imum for the largest machines of this type.

High-Speed Crushers

So far, all of the crushers we have been discussing have been of the "low-speed" class; that is, with eccentric speeds ranging between the approximate limits of 100-200 r.p.m. It is customary, as before mentioned, to rate such crushers at their *open-side* discharge settings, because there is a definite relationship between these values. Most modern crushers, designed for what may properly be classed as *fine-reduction* crushing, are of the *high-speed* type. The eccentric speeds and shape of the crushing chamber in the machines of this type are such that the maximum one-way dimension of the product particles is established by the *close-side* discharge setting; consequently it has become customary to rate these crushers at this setting.

Newhouse Crusher

The Newhouse crusher was one of the early developments in the high-speed class of fine-reduction crusher. This machine, a sectional view of which is shown in Fig. 7, incorporates several unusual features, at least one of which is unique in crusher design. The eccentric is direct-driven by a vertical motor mounted above the spider, the drive shaft running down through the hollow-bored mainshaft. Speeds range from 480 to 580 r.p.m., depending upon the size of the crusher, and upon the frequency of the electric current. Eccentric throws, as compared with those of the crushers we have been dealing with, are relatively low. This combination of small throw and high speed results in a very uniform product with a minimum amount of fines for any setting and ratio of reduction. A unique feature is suspension by means of cables, eliminating the usual foundation, although the crusher can be set on a foundation where required.

This crusher is usually furnished

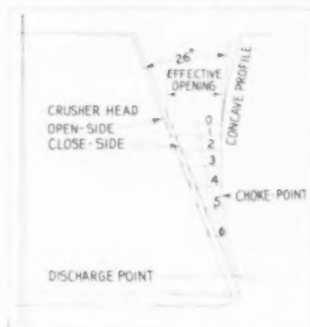


Fig. 6: Reduction crusher—non-choking concaves

with full-curve, non-choking concaves, which are reversible in the top shell. These concaves are of the same general contour as those shown in the diagram of the Superior McCully reduction crusher chamber, (Fig. 6) and in general the crushing chamber is similar, except that the chamber in the Newhouse crusher is somewhat deeper and, consequently, the head does not have as pronounced a flare. The important difference in the crushing action of these two machines lies in the difference in eccentric speed. That of the Newhouse crusher is so high that no material can drop through the almost parallel zone just above the discharge point without being caught between head and concaves and broken to a maximum one-way size closely approximating the close-side setting.

This crusher can be set somewhat closer than comparable sizes of the reduction crusher previously described. Although it cannot be classed as a fine-crusher it does belong to the fine-reduction class. Furthermore, by virtue of its large receiving openings, it rates as a machine for secondary reduction work. When so used it is usually fitted with concaves of the non-reversible, non-choking type, which are designed to make use of the full rated receiving opening of the crusher, although they sacrifice the feature of reversibility which permits wearing both ends of the concaves.

"Hydrocone" Reduction Crusher

The "Hydrocone" crusher (Fig. 8), was designed primarily with a view to achieving top performance in the field of fine-reduction crushing. It has also been adapted to what is designated simply as "fine-crushing," which extends into a range below that ordinarily defined by the term "fine-reduction."

Although the eccentric speeds of the various sizes of this type are not quite so high as the speeds used for the Newhouse crusher, the Hydrocone definitely rates as a high-speed ma-

(Continued on page 157)

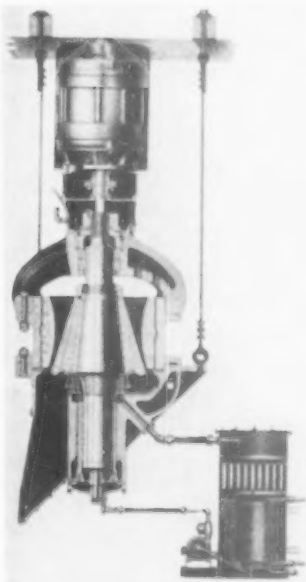


Fig. 7: Sectional view of a Newhouse crusher

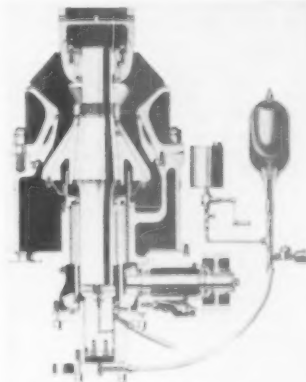


Fig. 8: Section through a Hydrocone crusher



Fig. 9: Type R fine reduction crusher

COOLING RATE OF CEMENT CLINKER

IN THE SEPTEMBER, 1950, issue of *ROCK PRODUCTS*, B. M. Pearson of Hassocks, Sussex, England, has published a translation of technical arguments which had been exchanged between D. Anselm and the writer of this article in the German magazine *Zement-Kalk-Gips*, vol. 3, 1949, page 39.

After Anselm's original article had been answered by the writer, it was felt that a reply to Anselm's second article should also have followed. Unfortunately, the publisher of *Zement-Kalk-Gips* decided that for lack of space, the writer's second answer could not be published. Therefore, Mr. Pearson's translation of the first discussions in *ROCK PRODUCTS* has been much appreciated by the writer since it now offers the opportunity to present an answer in one of our domestic magazines.

Reply to W. Anselm's Arguments

Chemical-Physical Properties. For the purpose of determining air quenching effect on grindability of clinker, it is, of course, necessary that only clinkers of identical raw material analysis are compared and that the comparison is made only after the clinkers have been burned to the same degree of burning. If, for instance, free lime content after burning is to be the control factor, it should be the same for both clinkers.

For clinkers so compared, it was found that the improvement to grindability of air quenched clinkers in all cases was more than 5 percent, and in quite a few cases, it has been observed as high as 15 percent.

It is also logical that the difference in grindability will be greater for well burned and therefore denser clinker than it will be for soft burned clinker.

Change of color of clinker is well known in connection with water quenching. Air quenching, however, does not produce the same results, at least not in commercial size units.

This has been well proven by the step-by-step replacements of rotary coolers with Fuller air quenching inclined grate coolers. No cement plant operator in our country nor anywhere else in the world could afford to change the color of his cement without serious harm to his sales interests. If this change of color claimed by Anselm would actually be experienced by any plant operator, the Fuller cooler would have a very limited chance for application in the cement industry. However, over 300 coolers have been sold to date.

*Fuller Company, Catusque, Penn.

By R. G. UHLIG*

Anselm's reference to a part of the report "Long-Time Study of Cement Performance in Concrete" is not well chosen, since during his studies L. S. Brown tried to develop, within the large program of this research work, a method by which it would be possible to determine glass content in clinkers accurately. L. S. Brown's studies and conclusions were well known to the writer, who did not at all contradict Brown's findings.

No claim had been made by the writer that determination of glass content of rapidly cooled clinker can be used for absolute judgment on volume stability of the clinker. The writer has only advised plant operators that a comparative evaluation of free lime content of air quenched clinkers of known raw material composition can be established by microscopic examination of glass content.

Technical and Economic Considerations. The method of burning close to the kiln discharge end to make full use of the available heat release volume of the kiln always has been normal practice in the U. S. Since the development of the air quenching cooling method, it is done with even greater care to secure the high clinker discharge temperature desirable for air quenching.

Under those conditions, it is hardly necessary to shift the position of the fuel pipe tip, especially since the highly preheated secondary combustion air from the air quenching cooler will increase the ignition speed of the fuel, thus creating a shorter flame.

No kiln exit chute can suffer from excessive clinker heat, because a kiln equipped with an air quenching cooler discharges its clinker into the vertical firebrick-lined cooler throat and not onto a chute. With air quenching coolers, kiln linings do not have to stand any greater requirements than are experienced with kilns with other types of coolers. The kiln nose ring question has been answered by American engineers by allowing some cooling air leakage (usually up to 10 percent of the total combustion air requirements) to enter between kiln and kiln hood, and by designing kiln hoods having special provisions to shield the nose ring and the nose ring brick from excessive heat. Where air leakage is not wanted, as a matter of requirement or of opinion, air seals of heat resisting alloy castings are applied.

As far as the writer can remember, the question of addition of fluxing agents in rotary cement kilns is handled in Europe in the same manner as it is in the U. S. Fluxing agents are added to reduce excessive sintering temperatures to normal rather than to reduce normal sintering temperatures to sub-normal ones.

On the question of integral coolers and integral recuperators, Anselm apparently is far behind the times. Those forerunners of the Fuller air quenching inclined grate coolers are rapidly replaced by the Fuller units. The integral cooler has proven to be more of an annealer than an air quencher, and the integral recuperator lacks the efficiency of intimate contact between cooling air and clinker, which the Fuller air quenching cooler possesses to a high degree. Furthermore, both integral designs have the disadvantage of high temperature clinker discharge.

Nothing had been said in the writer's first answer that he is comparing modern air quenching coolers with obsolete rotary coolers. This assumption is incorrect because the writer in his heat balances had clearly stated the differences in results obtainable between lined and unlined rotary coolers as they exist today, and had not considered comparison with an ideal rotary cooler existing only in the mind of designers.

A comparison of the heat balances submitted by the writer for both types of coolers will show that in both cases the heat values of the [American] Portland Cement Association have been used. Therefore, the consistency of the values will eliminate any unnecessary argument with respect to calculating basis.

Table I of the writer's first answer had been drawn up since it was obvious that in his criticism of Professor A. F. Taggart's publication, Anselm had given no consideration to the varying requirements for primary air of the various fuels. This, of course, was his fundamental error in judging the thermal efficiency of Fuller air quenching coolers vs. rotary coolers. Primary air amounts shown in this table are representative average values and any plant operator will know that they can and will vary with the specific type of fuel.

Table I also showed clearly that, depending on type of fuel, thermal efficiency of the Fuller air quenching inclined grate cooler can range from 68-82.2 percent. It will, therefore, be most difficult for the reader to ac-

(Continued on page 133)



First of the new Indian cement plants is this one of Shree Digvijay Cement Co. at Seeka, near Jamnagar in Kathiawar

CEMENT PLANTS IN INDIA INCREASE CAPACITY

By ERIK B. MOGENSEN*

THE CEMENT INDUSTRY in India was developed after the first World War, and mainly due to a number of far-sighted and progressive industrialists, this industry has grown to become one of the best organized and technically advanced industries in India. In 1936, all but one of the existing cement plants merged into a single company called Associated Cement Companies, Ltd., (A.C.C.) which at that time controlled ten cement plants with a total rated capacity of slightly more than 900,000 tons per year. At the same time consumption of cement in undivided India was about 1,000,000 tons, corresponding to 6 lb. per capita per year.

During the years preceding the second world war cement consumption increased steadily and new plants were being built. In the early years of this war the Associated Cement Companies, Ltd. controlled 12 cement plants with a rated capacity of approximately 1,500,000 tons, and a new combine called the Dalmia group controlled five plants with 600,000 tons rated capacity, and four smaller companies had four plants with a rated capacity of 350,000 tons.

Due to its very high technical standards and efficient organization, the industry made an excellent record during the war in spite of many difficulties such as shortages of coal and replacement parts and traffic restrictions, and attained a very high level of production and an unprecedented ratio of utilization. In 1942 the production was 2,300,000 tons, corresponding to more than 90 percent of rated capacity.

Before the war had ended, the government of India began to consider plans for an expansion of the cement industry in order to meet an increased

consumption which was foreseen as soon as conditions would become normal. When the war ended the industry was thus ready to implement these plans and the results are now beginning to show in the rapidly increasing production.

From 1945 to 1947 approximately 20 new completely equipped kiln units ranging in capacity from 150 to 500 tons per day were installed. Two of these units were obtained in the United States, 13 from Europe (Denmark and the United Kingdom) and the remainder were built in the shops of the Associated Cement Companies, Ltd.

With the separation of India from Pakistan in 1947, all but two of the new units were moved to India, where the majority of them are now either in operation or in the final stages of installation. At the beginning of 1950 the total rated capacity of Indian cement plants, exclusive of Pakistan, was about 2,900,000 tons, and when the new plants now under construction are in operation the rated output will approximate 3,900,000 tons. This capacity is expected to meet the anticipated demands of the immediate future.

In 1949 consumption was about 2,300,000 tons or approximately 16 lb. per capita, and this is expected to increase during the next few years. Production during 1949 was about 2,100,000 tons, corresponding to 75-80 percent of rated capacity, and some imports were therefore necessary, but imports are not expected to be required during 1950.

Economic Factors

It will appear from the foregoing that the average consumption in India is extremely low compared to the United States and most European



Dredge excavates shells from Travancore lake for processing and use in portland cement manufacture



New plant of the India Cements, Ltd., at Tinnevely near port of Tutticorin in South India



The Travancore Cements, Ltd.'s new plant near Kottayam in the United States of Travancore and Cochin

countries, and there seems to be ample scope for increasing this consumption. Consumption of cement is usually to some degree related to the standard of living, and in view of the determined efforts made by all authorities to increase the standard of living, the consumption of cement will no doubt increase correspondingly.

The consumption is mainly concentrated in the thickly populated areas around the big cities, and India's main market is Calcutta with the surrounding big industrial centers. Bombay with the district of Gujarat and the big cities on the Ganges plain are other big consuming centers and in South India there is an important market around Madras and the big

(Continued on page 145)

*F. L. Smith & Co., Bombay, India

INDUSTRIAL SAND PRODUCERS DISCUSS PROBLEMS CONFRONTING INDUSTRY

NATIONAL INDUSTRIAL SAND ASSOCIATION held a very successful and well attended meeting at the Broadmoor Hotel, Colorado Springs, Colo., on October 10 to 12. It was the semi-annual meeting with registrations entered from coast to coast. The fall weather was perfect for afternoon trips made to the many scenic spots in and around Colorado Springs: Pike's Peak, Cheyenne Mountain and the Will Rogers Memorial, Garden of the Gods, Cripple Creek and other interesting points.

Car Supply

It is the general practice at the fall meetings not to have outside speakers, so the discussions were rather informal and of a round-table nature. The first day's meeting was under the chairmanship of President Sterling N. Farmer, at which time the financial report was rendered and budget plans for 1951 outlined. Emery M. Durstine, chairman of the traffic committee, made his report. An industry-wide discussion of the car situation developed the information that during the months ahead there will be a daily shortage of 15,000 to 16,000 gondolas and about 20,000 box cars. Some 81,000 new cars are on order of which 19,000 are gondolas, 4000 covered hoppers and 39,000 box cars. This indicates that more cars are on order than a year ago, but it will take 18 to 24 months to get the new units in service.

It was learned that iron ore that is being imported from Venezuela, Labrador and Central Europe is rapidly claiming more and more gondolas for shipping the ore from the receiving ports in the United States to the steel mills. It developed that whenever a boatload of ore is expected a minimum of 100 gondolas must be waiting at the dock. This situation is having its effect on the overall picture and is a condition that is vitally affecting all car users.

Mr. Farmer suggested that receivers of sand should equip their operations to handle sand in either gondolas or hopped-bottom cars, especially the latter, as more hopped cars are available. One producer told of a user of sand who had a Barber-Greene unloader for discharging hopped cars. This device was described as a conveyor that could be shipped under the car—no track receiving hopper being used. Clarence R. Wolf told of an arrangement his company had made with a local railroad company whereby hopped cars could be used in a shuttle service. Such cars had a few heavy bars welded temporarily over the top of the well, or pocket, and

in service this part of the car was not unloaded—it always remained full of sand. The metal bars were simply to make it easier to unload such a car with a clamshell.

The discussion next turned to the number of cars being repaired; as of September 1, 1950, some 34,000 box cars were on the repair list, as well as 19,000 gondolas and 4900 hoppers. The trend is to faster car repairing. It was also pointed out that if a six-day week were used, turn-around time could be cut, and this would increase the car supply by about 20 percent.

Several producers said they spent from \$1.50 to \$3.50 making minor car repairs at the shipping point and that about 50 percent of all cars received had to be repaired. In several instances, the railroad supplied the lumber.

Outlook

Business outlook for the balance of the year and for 1951 was discussed. The producers were all asked to give a brief verbal report for their areas. The summation of these reports was quite optimistic, for in most cases it was indicated that business would be up 10 to 15 percent. However, there were a few weak spots, mainly because of local conditions, strikes and the availability of cars. Sand for the steel industry and for the glass container trade would probably show the largest increase.

Compensation Legislation

The meeting on the second day was under the chairmanship of C. M. Hardy. At this meeting Theodore C.

Waters, association counsel, gave an outline of the trend and nature of future legislation. In his preliminary remarks he called attention to the noticeable increase in activities related to air and stream pollution, and he felt that this increase would continue with greater activity. He said that it was the producers' responsibility to provide employees safe places to work and to eliminate hazardous conditions that might be injurious to the health of the public.

During the present year, the speaker said, only 19 state legislatures were in session but 12 of these amended their Workmen's Compensation laws. These changes dealt primarily with increased benefits for death, disability and medical care. In looking forward to 1951 he reminded his listeners that all state legislatures except four would be in session, that it was inevitable that drastic amendments will be proposed, and that it was each producer's duty to take an interest in these subjects to see that unreasonable restrictions were not imposed on them. Mr. Waters spoke briefly of laws enacted in Massachusetts, whereby claims for silicosis are now subject to the same provisions as other injuries. Prior to the enactment, partial disability for dust diseases was denied. Rhode Island amended its compensation law by extending the time limit for claims for occupational disease cases to 24 months after the date of disablement, instead of the date of contraction of the disease. The State Department of Health in West Virginia has just prepared and circulated a proposed Code of Industrial Hygiene



The group stopped at this lodge enroute to the top of Pike's Peak; this was about half way up

and in this code there is included a schedule of maximum allowable concentrations of various gases and dusts, including the following concentrations for silica:

In excess of 50 percent free SiO_2 —
5,000,000 particles per cu. ft. of
air;

5 to 50 percent free SiO_2 —20,000,
000 particles per cu. ft. of air;

Less than 5 percent free SiO_2 —
50,000,000 particles per cu. ft. of
air.

Included in the code is the recommendation for a maximum allowable concentration of total dust not to exceed 50,000,000 particles per cu. ft. The code is a guide; however, a specific mandatory provision applicable to the control of atmospheric contaminants is as follows: "Workers shall not be exposed to concentrations of atmospheric contaminants hazardous to health."

The Department of Health of West Virginia already has the authority to enforce the code. Mr. Waters gave this as an illustration of the continuing and increasing interest in activities of state agencies in the promulgation of programs of industrial hygiene, and that most of his listeners would have to face state controls of this nature. The speaker also talked on the trends in workmen's compensation legislation relating to the use of medical boards and examiners in occupational disease claims. The trend is towards increasing the powers of medical examiners. In some states the medical board is an advisory one, and in others the decisions of the medical board are binding, except upon appeal by some agreed party.

Packing Machinery

Stanton Walker, engineering director, briefly outlined what was on the agenda in the way of new sacking equipment of a more dustless nature. Arnold H. Tanzer told of his personal experience with a type of dustless sacker which was discussed in detail at a previous meeting of this group. The sacking unit was being used in New York State to pack asbestos fiber. The machine produced a firm rectangular paper bag that compressed the asbestos into the container so that an 11-lb. sack of the material occupied a very small space. Mr. Tanzer felt that the machine as now built would not be of much value to the group. P. W. Palmer described a packing machine made by the Coddington Manufacturing Co. of Milwaukee, Wis., that used a high speed screw driven by a 2-hp. motor. He said that after seeing the machine in operation he felt the unit was a very promising addition to any packing plant as it was practically dustless. He planned to install one of the units at one of his plants. The cost of the machine was about \$1000 per tube, he said, and the spiral of feed screw lasted, on one application about three months. A new screw costs only \$27.

(Continued on page 144)



Left to right: Mr. and Mrs. C. H. Woods, and Mr. and Mrs. A. Warsaw at the Will Rogers Memorial



A group of Indians, left to right: Chief Junius M. Strauss, Mrs. Strauss, E. J. Campbell, two real ones, and Mr. and Mrs. Al M. Harris



Left to right: Robert W. Muhlfner, W. H. Paddison, Mrs. Jesse T. Marie, and Mrs. Paddison at Cheyenne Lodge

Cement and Quarry Men Discuss Hazardous Operations and Driver Training

YOU CAN'T BUY SAFETY . . . and lip service to safety will not prevent accidents," declared Stanley M. Walker, mining engineer, U. S. Bureau of Mines, Birmingham, Ala., in emphasizing the general theme of the meeting of the Cement and Quarry section of the National Safety Council, whose sessions were held at the Stevens hotel in Chicago, October 18 and 19.

Initial meeting of the two-day session got under way Wednesday afternoon, October 18, with General Chairman Lea P. Warner, Jr., of the Warner Co., Philadelphia, Penn., welcoming the representatives to the sessions. Members were present from all the divisions of the Cement and Quarry section to comprise the attendance at the 38th annual National Safety Council and Exposition.

First speaker at the Wednesday afternoon meeting was Forrest T. Moyer, chief, Accident Analysis Branch, U. S. Bureau of Mines, Washington, D. C., whose subject was "What We Need for Safety Progress." Mr. Moyer discussed the application of safe practices in plant operation and described the constant improvement in safety measures employed in the industry, at the same time pointing out a number of steps which should be taken to reduce plant accidents further and to better the safety record. Topmost among these, he indicated, was a close cooperation of all plant personnel, including top management, in the matter of overall plant safety. He reported that the 1949 injury rate was 5.18 disabling injuries

per million man-hours in the cement industry, a reduction of 24 percent from 1948, and that the frequency of quarry disabling injuries was 17.43 per million man-hours, a reduction of 9 percent from 1948.

Safety Slides Shown

"Safeguarding Heavy Operations" was the subject treated by A. R. Graham, superintendent of safety engineering, Chicago district, Bituminous Casualty Co., Chicago, second feature speaker of the first day's session. Mr. Graham's interesting and enlightening discussion on guards for heavy equipment was illustrated by the use of slides showing heavy equipment in operation in the plant and emphasized the function and need of proper safeguards in the operation of such equipment. Mr. Graham emphasized the necessity for belt guards strong enough to withstand a belt breakage.

What was undoubtedly the keynote of the sessions was sounded by Mr. Walker, who rounded out the afternoon session of the first day. Mr. Walker also illustrated his talk with slides of graphs and charts which he used to emphasize salient points in his theme, "Safety Consciousness—An Evaluation." This outstanding authority on safety in mining and quarrying operations revealed how a definite safety pattern develops—good or bad—in each plant, as well as for the industry as a whole. His charts illustrated how the safety pattern was best in plants having wholehearted cooperation of top management with

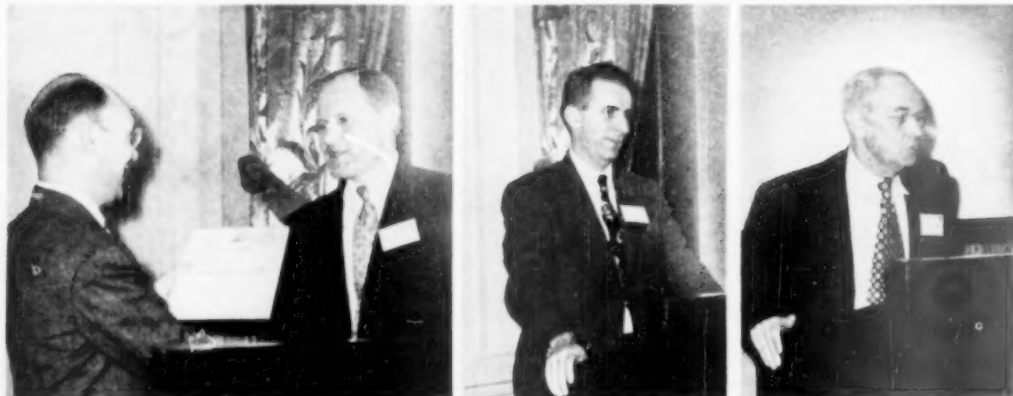
all levels of personnel in the matter of plant safety, and less good in plants where such united effort was lacking—and in direct proportion. He emphasized that the behavior pattern of the workers was closely connected with the attitude of top management in the matter of plant safety.

Following the address of Mr. Walker there was an interesting question and answer period and time for general discussion of the subjects introduced by the speaker.

Officers Re-elected

First order of business at the Thursday afternoon meeting was the election of officers for 1950-51 of the Cement and Quarry section of the National Safety Council. All officers were re-elected. They are as follows: general chairman, Lea P. Warner, Jr., Warner Co., Philadelphia, Penn.; vice-chairman, M. C. M. Pollard, National Gypsum Co., Buffalo, N. Y.; secretary, Robert S. Boynton, National Lime Association, Washington, D. C.; News Letter editor, O. L. Staggs, Lone Star Cement Corp., New York, N. Y.; engineering committee chairman, L. D. Cowling, Louisville Cement Co., Speed, Ind.; membership committee chairman, T. W. Jones, New Haven Trap Rock Co., New Haven, Conn.; program committee chairman, Ivan LeGore, Portland Cement Association, Chicago, Ill.; statistics committee chairman, Forrest T. Moyer, U. S. Bureau of Mines, Washington, D. C.; visual aid committee chairman, H. G.

(Continued on Page 136)



Left: M. C. M. Pollard, National Gypsum Co., Buffalo, N. Y., presenting certificate of merit for plant safety to Chairman Lea P. Warner, Jr., of the Warner Co., Philadelphia. Mr. Pollard is vice-chairman of the Cement and Quarry Section of the National Safety Council. Center: L. P. Struble, Jr., general manager of Keystone Division of the Dravo Corp., Pittsburgh, Penn., told about safety in plant hauling operations. Right: Stanley M. Walker, mining engineer, U. S. Bureau of Mines, Birmingham, Ala., emphasizes a safety point at the first day's session.

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Collins, Lehigh Portland Cement Co., Allentown, Penn.

Members-at-large include V. P. Ahearn, National Sand & Gravel Association, Washington, D. C.; J. R. Boyd, National Crushed Stone Association, Washington, D. C.; F. J. Buffington, New York Trap Rock Corp., Newburgh, N. Y.; P. N. Bushnell, Universal Atlas Cement Co., New York, N. Y.; A. J. R. Curtis, Portland Cement Association, Chicago, Ill.; F. R. Sittie, The Kelley Island Lime & Transport Co., Cleveland, Ohio; O. M. Graves, The General Crushed Stone Co., Easton, Penn.; Johan Norvig, Pennsylvania-Dixie Cement Corp., Nazareth, Penn.; Walter J. Seahill, Missouri Portland Cement Co., St. Louis, Mo.; W. E. Wing, Marblehead Lime Co., Chicago, Ill.; and Robert L. Moore, National Safety Council, Chicago, Ill., staff representative.

Driver Training

Following the election of officers, an illustrated talk on driver training for plant vehicles was given by L. P. Struble, Jr., general manager, Dravo Corp., Pittsburgh, Penn. Mr. Struble's discussion incorporated the findings of the Committee on Truck Driver Education of the National Ready Mixed Concrete Association together with an outline of the truck driver training program launched in his own plant. The latter included a program of rewarding accident-free driving by cash awards paid quarterly to qualifying drivers. The speaker indicated that the cash-award plan had been successful in curtailing accidents in a number of plants and was expected to be adopted more widely in the industry. His slides showed the steps taken by his company in its driver-training program. Among these were the presenting of each driver with a printed booklet with his name on it, which contains the safety rules and operating policy of the company in regard to its vehicles and setting forth suggestions for safe handling of the trucks within and without the plant.

A most interesting discussion on the value and functions of the Safety Committee was presented by Arthur J. Matthias, safety coordinator, Wisconsin Schools of Vocational and Adult Education, Madison, Wis. Mr. Matthias pointed out, with the addition of humorous anecdotes, how plant safety is not so much a function of any one group as it is the cooperation and "follow through" in matters of safety of all groups and levels of plant personnel. He outlined the proper functions of top management, safety engineer and safety committee, foremen, inspection and investigating committees in plant accident prevention. Mr. Matthias' very effective and down-to-earth speech emphasized that plant safety is everyone's responsibility and that safety meetings in plants best accomplish their objectives when they are regularly held, well planned and made interesting, and when they reach all personnel.



Here is the 1950-51 executive committee of the Cement and Quarry Section of the National Safety Council in attendance at the Safety Congress: seated, left to right, R. L. Moore, National Safety Council staff representative; A. J. R. Curtis, Portland Cement Association, Chicago; Lea P. Warner, Jr., chairman, Warner Co., Philadelphia; M. C. M. Pollard, vice-chairman, National Gypsum Co., Buffalo, N. Y.; Forrest T. Moyer, statistics committee chairman, Bureau of Mines, Washington, D. C.; standing, left to right, Walter J. Seahill, Missouri Portland Cement Co., St. Louis, Mo.; H. G. Collins, visual aid committee chairman, Lehigh Portland Cement Co., Allentown, Penn.; Ivan F. LeGore, program chairman, Portland Cement Association, Chicago; Kent Jander, National Lime Association, Washington, D. C.; O. L. Stoggs, News Letter Editor, Lone Star Cement Corp., New York, N. Y.; and T. W. Jones, membership chairman, New Haven Trap Rock Co., New Haven, Conn.

Concluding the second day session and winding up the 38th annual meeting was a panel discussion with audience participation on the subject "Correct the Mistakes" which was conducted by Walter J. Seahill of Missouri Portland Cement Co., St. Louis, Mo. This discussion treated the subjects of employee indoctrination, safety inspection and accident investigation.

A feature of the Thursday afternoon session was the awarding of the 1949 Safety Plaque of the Cement and Quarry Section to the Warner Co., Philadelphia, Penn., for the best safety record in the section in 1949. The award was made by M.C.M. Pollard of National Gypsum Co., Buffalo, N. Y., representing the Safety Council to Lea P. Warner, Jr., representing the Warner Co.

Cement Developments in East Africa

FOLLOWING SUCCESSFUL EXPLORATORY studies last year in East Africa of Kenya and Uganda limestone and marble deposits, two cement plants were built, one at Tororo in Uganda, and the other at the Masai Reserve, south of Sultan Hamad, Kenya. The shortage of cement in East Africa since the war has slowed building construction, and should the quality of locally manufactured cement prove satisfactory, the effect on the local economy would be significant. According to recent reports, samples that have been analyzed have shown high calcium and low magnesia content. However, there is no certainty that production costs will allow successful competition with imported cement, according to *Mineral*

Trade Notes issued by the U. S. Bureau of Mines.

A report from the Union of South Africa says that the new cement plant at Pretoria will use 540,000 tons of limestone and shale annually which will be quarried near the plant. The 17,500 tons of gypsum required per year will come from mines in the Kimberley area.

In Norway, output of cement in 1949 was 592,184 metric tons, an increase of 67,000 tons over 1948. Machinery that will add 100,000 tons capacity is being installed in one plant. Output in 1950 is expected to be at least 600,000 metric tons. Despite the tremendous increase in production, construction demands have been equally great, so much so that when the rationing of cement ended in April, 1949, the supply situation became chaotic. It was necessary to reimpose rationing late in 1949, and it is reported that the supply of cement for priority construction returned to normal only a short time ago.

U.S.D.A. Lists Liming Materials Supplied to Farms

A RECENT REPORT of the U. S. Department of Agriculture tabulates conservation materials and services furnished to farmers under contract and purchase order plans for the 1950 program during the period April through June, and cumulative totals for the 1950 program through June 30, 1950. Total amount of liming materials furnished in the 1950 program ending June 30, 1950 was 3,387,147 tons. This compares with a total of 3,340,286 tons furnished in the 1949 program.

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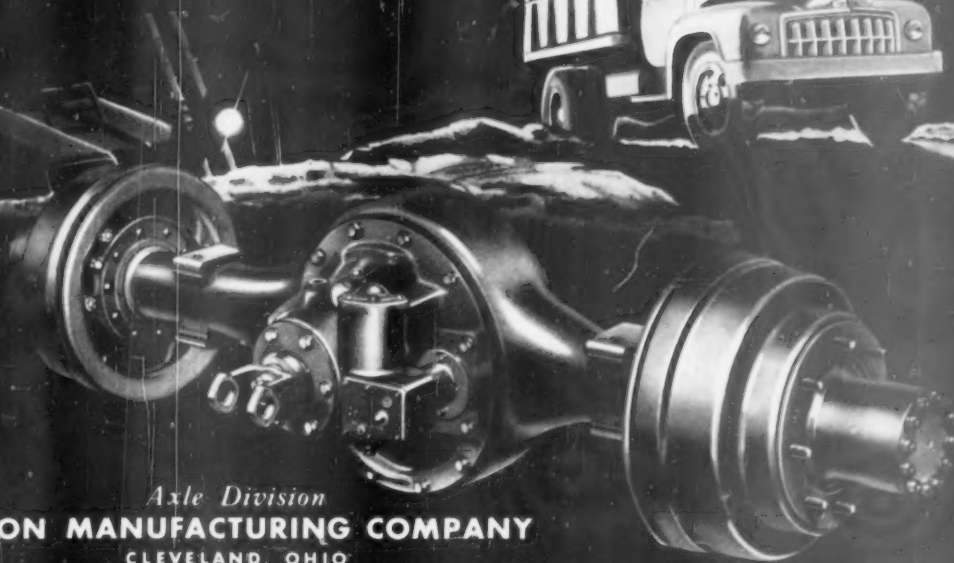
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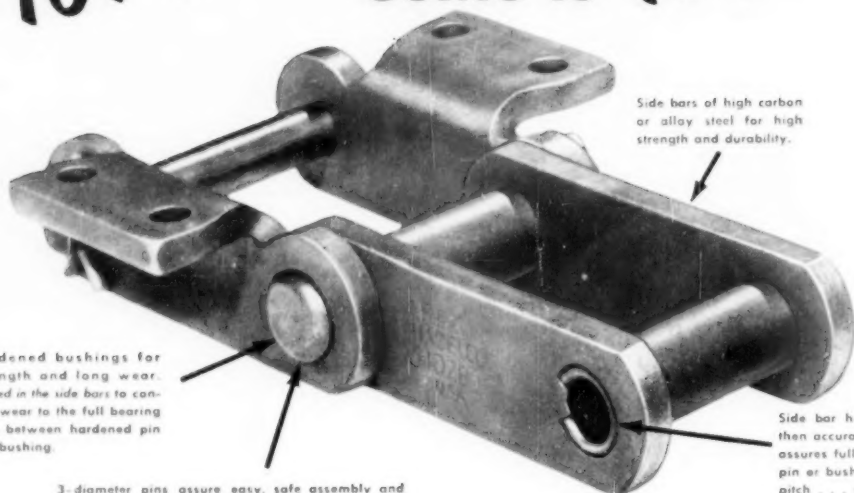
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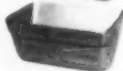
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Rex Chabelco all heat-treated steel elevator chains are the ultimate where service is rough and tough! There is good reason why these all steel elevator chains last longer . . . handle more tonnage per chain dollar. It's the accurate pitch that means smooth sprocket action . . . the precision-built, heat-treated parts pressed together to stay that make **Rex Chabelco** outstanding for severe bucket elevator service.

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**DRIVE AND
CONVEYOR CHAINS**

MINING ENGINEERS VISIT AGGREGATES PLANTS

By WILLIAM E. HAM*

A VARIED PROGRAM attracted approximately 65 members and guests to the Norman, Okla., regional meeting of the Industrial Minerals Division, A.I.M.E., October 17-20. The Oklahoma Geological Survey was host to the meeting, held on the North Campus of the University of Oklahoma. The program included a technical session of 14 papers, a field trip to the industrial mineral plants and quarries of the Arbuckle Mountains, and a field trip to the pre-Cambrian rocks of the Wichita Mountains.

The technical sessions, held on October 17 and 18, were characterized by papers on mineral development in the rapidly growing Southwest, in addition to which there was a symposium on occurrence and origin of titaniferous magnetites.

Richard M. Foose, Industrial Minerals Division, A.I.M.E., presided at the opening session with Robert H. Dott, director, Oklahoma Geological Survey. The first paper, by Harold B. Foxhall, director, Arkansas Geological Survey, entitled "Trends in the Industrial Mineral Industries of the Southwest," reviewed the 300 percent increase in dollar value within the region of Kansas, Oklahoma, New Mexico, Texas, Louisiana, Arkansas, and Missouri during the 1939-1948 period. This region contributes 30 percent of the mineral wealth of the United States, amounting to \$388,000,000 in 1948. A large percentage of this figure is attributable to mineral fuels, chiefly petroleum and natural gas. Foxhall pointed out that within this period production of barite in-

creased 621 percent, cement 267 percent, lime 318 percent, salt 218, heavy clay products 230, gypsum 800, sand and gravel 272, sulfur 251, and stone 191 percent.

Review by States

In a review by states, it was shown by charts and colored slides that the expansion in Oklahoma was principally in high-purity dolomite, silica sand (including the first production of ground silica), lime, cement, crushed stone, sand and gravel, veneer stone, gypsum, and brick and pottery clay. In Kansas cement manufacture is up 200 percent, and the same trend is noticeable in brick and tile, gypsum, sand and gravel. Salt production in Kansas has remained comparatively stable, whereas volcanic ash is down, its use being supplanted by feldspar and the new detergents. New Mexico reports a marked increase in perlite and pumice, and, as elsewhere, production of construction materials is up sharply; the state continues to be the largest producer of potash.

Missouri is a leading producer of barite, cement, refractory clays, lime, and stone. Barite and lime are down slightly in 1949 from 1948, but cement production is up. Manufactured clay products reached a peak in 1943 at \$35,000,000, and total clay production was at a maximum of 2,400,000 tons in 1949. In Louisiana the principal industrial minerals are salt and sulfur. Texas is the leading producer of sulfur and also ranks high in production

of cement and gypsum, together with other industrial minerals discussed later by Dr. Lonsdale. In Mr. Foxhall's home state, Arkansas, significant new developments include a \$3,000,000 roofing granule plant of Minnesota Mining and Manufacturing Co. at Little Rock (1947), Reynolds limestone quarry, furnishing chemical limestone for the Hurricane Creek alumina plant (1948), Tex-Ark Rock Wool plant at Texarkana (1948), and Eureka Brick and Tile plant at Clarksville.

The second paper was entitled "Geology and Industrial Minerals in Oklahoma," by Robert H. Dott, director, Oklahoma Geological Survey. Mr. Dott gave the geologic background of the state and reviewed a list of 34 minerals and rocks in Oklahoma, most of which fall in the class of industrial minerals. Total value of mineral production for 1948 was \$503,654,000 of which fuels, zinc, and lead accounted for \$488,426,000 or 97 percent. The nonmetallic minerals produced are asphalt, calcite, cement, chats, clay, dolomite, glass sand, grahamite, granite, gypsum, hematite, lime, metabentonite, pumice, salt, sand and gravel, stone, and tripoli.

The geographic distribution of these materials and their relation to geologic provinces was shown by slides. Regarding value added by manufacturing, it was noted that in the major industry groups "stone, clay and glass products" made up 7 percent of total manufacturing, and Mr. Dott concluded that a breakdown probably would show glass products to be the major item in the above group, and that glass manufacturing is the fastest-growing phase of the state's mineral processing industry.

Arbuckle Mountain Minerals

The following paper, "Industrial Minerals of the Arbuckle Mountains, Oklahoma," by William E. Ham, Oklahoma Geological Survey, called attention to the concentration of industrial mineral plants and quarries in 450 square miles of the Arbuckle Mountain region of south-central Oklahoma. It was noted that the region produces ten different basic raw materials from 12 principal quarries, the total value of raw materials plus the value added by manufacturing within the region being about \$6,500,000 per year.

For the state of Oklahoma, the Arbuckle Mountain region produces all the silica sand, all the dolomite, all the native asphaltic rock, much of the building stone, and half the cement.



Silica sand quarry of Mid-Continent Glass Sand Co., Roff, Okla.

Along with these resources there is production of crushed stone, sand and gravel, and brick shale. One of the principal items is cement manufacture at the Ideal Cement Co. plant at Ada, which obtains high-calcium limestone and shale from the quarries at Lawrence in the nearby Arbuckle Mountains; this plant is currently expanding its facilities by more than 40 percent through the addition of a new rotary kiln, ball mill, and other equipment. Silica sand in the region is produced by the Mid-Continent Glass Sand Co. at Roff and by the Pennsylvania Glass Sand Corp. of Oklahoma at Mill Creek. The plant at Roff uses a flotation process to remove impurities, notably pyrite, and is the pioneer company in the United States to make this application of flotation.

In addition to its use in glass manufacturing, the Arbuckle Mountain sand is sold for foundry use and for the manufacture of sodium silicate, and is ground by the Pennsylvania Glass Sand Corp. to silica flour. High-purity dolomite is quarried and processed by the Rock Products Manufacturing Corp. at Troy, which ships about 4250 tons per week for fluxing stone in iron-ore smelting, for glass manufacture and agstone. Native asphaltic sandstone and limestone are worked in two quarries by the Southern Rock Asphalt Co., which blends the two materials and markets the asphaltic composition for road surfacing. About 1700 tons per day are sold during the spring and summer months. Crushed stone for railroad ballast, highway construction, aggregate, agstone, and filter stone is produced by the Dolese Bros. Co. in two quarries at Big Canyon and Bromide, and by the Bayford Stone Co. near Davis. Sand and gravel comes chiefly from Rock Creek near Dougherty, where the Makins Sand and Gravel Co. operates a processing plant and ships about 2000 tons per day.

Geological Survey

The afternoon technical session on October 17 was presided over by C. H. Moore, Jr., National Lead Co., and R. C. Stephenson, chairman, Papers and Programs Committee, A.I.M.E., when a symposium on titaniferous magnetites was held. Two papers were read: "Titaniferous Magnetite in Basic Rocks of Wichita Mountains, Oklahoma," by Gerald W. Chase, Oklahoma Geological Survey, and "Geology and Utilization of the Titaniferous Magnetites at MacIntyre Development, Tahawus, New York," by George W. Wunder and Paul W. Allen, National Lead Co. These papers were followed by discussion from R. C. Stephenson, J. L. Gillson, and R. T. Denis, and a reading of prepared statements by A. M. Bateman and H. Ramberg.

Following a dinner the same evening, C. V. Millikan, vice-president, A.I.M.E., introduced the speaker of the evening, Hugh D. Miser, U. S.



Dolomite crushing and screening plant of Rock Products Mfg. Co., Troy, Okla.

Geological Survey, who spoke on "Making a Geologic Map of Oklahoma," a project in which Mr. Miser is currently engaged.

E. H. Crabtree, Jr. and J. D. Sullivan were co-chairmen at the morning session October 18, when the first paper was "Mineral Industry in Texas," by John T. Lonsdale, director, Texas Bureau of Economic Geology.

Texas Rock Products

Through the use of slides he pointed out eight major geologic provinces in Texas and showed the mineral resources contained in each. The great area of Cretaceous rocks in central Texas contains important deposits of limestone, dolomite, clays, cement materials, rock asphalt, silica sands, gypsum, and coal; the Coastal Plain area, underlain by Cenozoic rocks, has very large deposits of clays including refractory clays and bentonitic types, salt, sulfur, lignite, cannel coal, volcanic ash, brown iron ore, gypsum,

oyster shell, sand and gravel, and peat. The Llano uplift in central Texas is the so-called Central Mineral region, which has produced building stone, dolomite, graphite, soapstone, feldspar, and iron ore, as well as potentially important materials with some production in the past such as magnesite, serpentine, vermiculite, fluorite and lead ores.

The mineral industry in Texas is based on the abundant common materials: cement, clay, sand and gravel, stone, lime, salt, and gypsum, but in addition there is production of specialized mineral commodities such as sulfur, sodium sulfate and helium, graphite and soapstone, bromine, magnesium and magnesium compounds from seawater, and asphalt rock. The minor materials are silica sand, feldspar, mica, celestite, sulfur earth, volcanic ash, barite, manganese ore, magnesite, and grinding pebbles.

(Cont. read on page 142)



Quarry in asphaltic limestone, 130 ft. high, of Southern Rock Asphalt Co., Dougherty, Okla.

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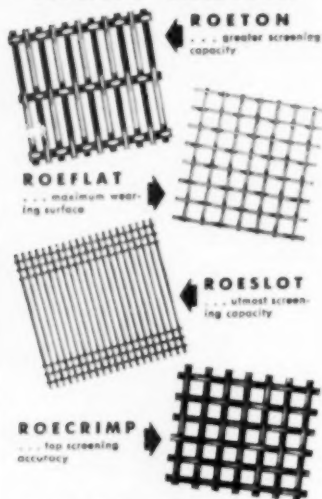


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A CENTURY OF CONFIDENCE

Dr. Lonsdale concluded by saying that there has been a consistent rise in production of most industrial minerals, which has paralleled that of oil and gas. The petroleum industry has been the cause of increased production of mineral commodities used in all sorts of construction. It also created a market for bleaching clays and drilling mud. Markets have also been created by the recent vast expansion of chemical industry in the Coastal Region.

Final papers of the morning session included: "Gulf Coast Sulfur—An Industrial Mineral," by Albert G. Wolf, Texas Gulf Sulfur Co., "Production of Anhydrous Sodium Sulfate from Natural Brines," by William I. Weisman and R. C. Anderson, Ozark-Mahoning Co., and "Clay Resources of the Wilcox Group in Arkansas," by Norman F. Williams, Arkansas Geological Survey.

At the afternoon session, with V. H. Schnee and H. M. Bannerman as co-chairmen, a movie entitled "Drama of Making Portland Cement" was shown and narrated by Cecil Perkins, Portland Cement Association, and this was followed by "Review of the Kansas Salt Industry" by Earl K. Nixon, Kansas Geological Survey. The next paper, "Specifications for Specific Uses of Limestone and Dolomites," by Edward L. Clark and Mable E. Phillips, Missouri Geological Survey, was in part a bibliographic review. It was emphasized by Dr. Clark that strict specifications are required for certain specialized commodities but, in general, proximity to consumer is considerably more important than detailed physical and chemical requirements.

In the following paper, "Barite Production in Missouri," by Garrett A. Mulenberg, Missouri Geological Survey, it was pointed out that the most active center of mining is in Washington County, about 50 miles southwest of St. Louis, which has produced a large percentage of all the barite mined in the United States. Most of the barite is in residual deposits lying on Cambrian dolomite formations, the deposits being worked in open pits by power shovels. Milling and concentration processes were described. Dr. Mulenberg said that more barite has been mined in Missouri than any other state, producing since 1850 more than 5,000,000 tons valued at more than \$32,000,000.

Treatment of Chats

The technical sessions were concluded by a paper on "Chats in the Tri-State District," by Ernest Blessing, U. S. Geological Survey. As used in the zinc-lead district of northeastern Oklahoma, southwestern Missouri, and southeastern Kansas, chats consist principally of chert and limestone coarse tailings resulting from the milling of the ore. An estimated 200,000,000 tons of chats have been sold or otherwise removed from the district since they were first used

about 1900, of which about 75 percent is used for railroad ballast and 25 percent is used for highway construction, foundations, sidewalks, concrete block, blasting sands, and shingle coating. Chemical composition of the chats is reasonably constant, ranging between about 1 and 17 percent, but screen analyses are widely variable owing to differences in ore-milling practices and to the number of times the waste piles have been remilled. Some chats have on the 30-mesh screen, for example, a cumulative 6 percent retained, whereas most others have 70 to 100 percent.

Mr. Blessing pointed out that freight rates were increased about 30 percent in May, 1950, which have restricted sales to distant shipping points. Reserves are estimated at 160,000,000 to 200,000,000 tons, which, together with that added by current operations, will probably be sufficient for at least 50 years.

The final two days of the meeting were devoted to field trips, one by Gerald W. Chase, Oklahoma Geological Survey, to the pre-Cambrian igneous rocks and titaniferous magnetites of the Wichita Mountains, and another by William E. Ham, Oklahoma Geological Survey, to the industrial mineral quarries and plants of the Arbuckle Mountains. The Arbuckle Mountain trip included visits to the Ideal Cement Co. quarry, Mid-Continent Glass Sand Co., Pennsylvania Glass Sand Corp., Rock Products Manufacturing Co. (dolomite), Southern Rock Asphalt quarries and blending plant, Ravford Stone Co., and the Dolese Brothers Co.

Phosphate Bed Drilling

A RECENT BUREAU OF MINES publication reports the improved methods of diamond-drilling in phosphate-bearing beds in southeastern Idaho and southwestern Wyoming. These methods have resulted in greater core or sample recovery. Using efficient drilling practices and tools, the Bureau recovered an average of 82 percent of the core from the 11 holes drilled in the phosphate beds, according to the report.

Experimental drilling was done in Bear Lake, Caribou and Bingham counties in Idaho and at Lee in Wyoming. A truck-mounted gasoline-powered drill on a 36-ft. steel mast, commonly known as a seismograph drill, was used. Modifications were made in the standard drill head and by relocation of the water pressure gauge.

The report contains detailed drill hole information, descriptions of the core barrel, bits and drilling practices. Entitled "Experimental Diamond Core-Drilling in the Phosphoria Formation in Southwestern Idaho," Report of Investigations 4597 may be obtained free from the Bureau of Mines, Publications Section, 4800 Forbes St., Pittsburgh 13, Penn.

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N.I.S.A. Meeting

(Continued from page 133)

The subject of better wearing parts for present types of packers was discussed and Mr. Tanzer described a nickel alloy made by the International Nickel Co. that was proving helpful. Marcus Wright III said cast blades shatter more easily but wear better, in



Mr. and Mrs. Arthur B. Schlesinger on the way to Pike's Peak

the ratio of 4:1. Another member told of Part No. 104459 as supplied by the St. Regis Co., saying it was a resistant alloy of promise.

Stream and air pollution was briefly discussed and one instance was cited where a sand and gravel company was spending \$150,000 to prevent stream pollution.

Washington Happenings

The third and final day of the meeting developed what may be a new trend in convention administration, for the ladies were invited to sit in and they responded wholeheartedly. C. R. Wolf was the presiding officer. The executive secretary of the National Industrial Sand Association made a very able presentation of the Washington scene and of developments in our national life that were of great significance. It was pointed out that car supply requirements were 44 percent greater for the last quarter as compared to a year ago and indications are that conditions in the fourth quarter will be a little better to the extent of about 1000 additional cars.

The general subject of the use of the Consumer's Price Index was analyzed by the speaker who pointed out that this index was intended as a measurement of trends and that its use as a basis for raising or lowering wages could lead to disaster. Big Business which used this index voluntarily was asking for governmental controls on one hand, and on the other crying because of still other government controls that have been imposed. In the speaker's opinion, as long as we make it a policy of trying to contain Com-

munist, and Soviet Russia follows its apparent expansion program, there will be no peace in the United States for periods that would span the remainder of any of his listeners' lifetimes.

The speaker told of the stockpiling program, which in the popular mind was considered to be a program that had been underway for some time. However, when the war in Korea started there was a rude awakening to the fact that we had no stockpiles, especially of such materials as rubber, nickel and copper—all strategic materials. It was also pointed out that the United States now has a "life line" similar to that of the British Empire, by which we are now getting iron ore through sea lanes that have to be kept open at all costs. Water transportation both on inland and ocean waters will be increasingly important. This means increased Navy expenditures.

Tax Outlook

These and a variety of other subjects all added up to a rather dreary picture; excess profits taxes are a political requirement; a possible personal excess profit tax; paying for a war on the pay-as-you-go basis will result in personal taxes that will be higher than we have ever known; cost of combat equipment has increased since

industries are essential to a war economy. This could mean that the industrial sand producers will find it easier to get supplies in the case of an all-out war.

When the speaker was asked what business should do during times such as we are about to face, and are facing, his advice was about as follows:



Arthur T. Harris, left, and George F. Pettinos, Jr. George is wearing the latest Cripple Creek style hat

"Do today the things you think best for your business and defer decision on tomorrow's actions until tomorrow."

The day's meeting closed with an informal talk by E. J. Campbell, who, being a native of the Colorado mining section, especially the Cripple Creek area, told of some of his earlier experiences before he became a producer of industrial sand.

Geological Survey in Kansas

THE DEPARTMENT OF THE INTERIOR has announced the publication of Geological Circular 38. This circular contains a geologic map and report showing construction materials available for the building of dams, irrigation canals, highways, airports and other engineering structures in Jewell County in north-central Kansas. The survey is a part of the program outlined for the development of the Missouri River Basin. The field party conducting the survey consisted of personnel from the State Highway Commission of Kansas and from the Geological Survey. Among the geologic formations found that are sources of construction materials were Dakota sandstone, Graneros shale, Greenhorn limestone, Carlile shale, Smoky Hill chalk and alluvial deposits.

Buys Limestone Company

MCCURTAIN LIMESTONE CO., Idabel, Okla., has been purchased by Lester B. Arwin. The company which operates the quarry has been owned in the past year by J. G., R. G. and L. E. Brown. Mr. Arwin plans to expand operations.



Mr. and Mrs. T. E. Rust of Concrete Materials Co., Waterloo, Iowa, attend their first meeting of N.I.S.A.

World War II in the ratio of 190 to 100; labor supply will be increasingly difficult; a ruthless policy of non-deferment of men in the 19 to 25 year brackets for military service regardless of occupation or number of dependents; doctors and dentists under 50 years to be drafted; \$55 billion spending for the fiscal year and the \$30 billion for defense alone (per year) is only a beginning—these were a few of the bleak conditions we are to face, the speaker pointed out. One bright spot was that sand is exempt from renegotiation and if war controls and priorities are comparable with the last war, the officials in Washington have now learned that all

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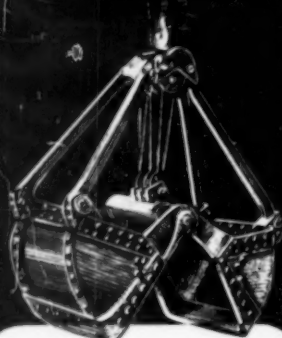
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Indian Cement Plants

(Continued from page 137)

South Indian cities. In the whole of the interior the consumption for private purposes is small but large requirements may be expected for the construction of dams and roads.

Limestone deposits suitable for cement manufacture are comparatively few and are mostly found in remote places. There are no useful deposits within several hundred miles of the big cities of Calcutta, Bombay and Madras. The best deposits are found in the Kathiawar Peninsula on the west coast and in Rajputana in the interior. Also in central provinces and in Bihar are several useful deposits and some scattered deposits are found in South India. Limestone deposits are also found in the lower Himalayas, but the inaccessibility of this region makes the construction of cement plants impracticable.

The location of a deposit is, due to the above mentioned geographical conditions, of the first importance for the location of the cement plants.

Trends in Technical Developments

As stated previously, Indian cement plant operators have always been extremely progressive and they have always as a matter of policy installed the most modern and efficient machinery available. There are, however, certain factors which must be taken into consideration when selecting machinery for Indian plants, the most important of which is the lack of skilled labor and the cheapness of unskilled labor.

The trends are, therefore, in some respects different from those in the United States, and Indian manufacturers find it advantageous to utilize the least complicated machinery and the simplest possible layout. This is shown plainly by the fact that the Dalmia group which was running four dry-process plants decided to install wet-process machinery for the extension of these plants. They have found that the saving in fuel was more than outweighed by the increased power consumption and especially by the greater complexity of the machinery which made it impossible to keep the plants running in steady production with the labor available.

This is also shown in the manufacturer's reluctance to install closed circuit grinding in the raw mill department. The question of whether the introduction of such machinery pays depends very much on the raw material situation, and in India it is a very important point in favor of straight grinding which is less complicated. Closed circuit grinding for cement has, however, been introduced at several plants which are being prepared for the day when quick hardening and other special cements will be in demand in India. With the high air temperature in India, the closed circuit

grinding offers special advantages, when the question is one of fine grinding.

Most of the new kiln units installed in India have been 300 and 350 ton units with integral planetary coolers. The Dalmia group prefers the 500 ton units and is installing the four largest kilns in India. Due to limitations in loading facilities it would be very difficult to transport larger units on the Indian railways. Two of the smaller plants are installing 200 ton units.

As coal is very expensive in India except in the coal districts in Bihar, fuel economy is very important and a considerable number of the new kilns are therefore provided with slurry preheaters to give the best possible fuel economy.

Cement has so far always been packed in jute bags, but with the enormous increase in the price of jute, this type of packing has become very expensive and manufacturers are taking an increasing interest in paper bags. Automatic packing and use of valve bags are, however, not yet common practice.

Finally, it should be mentioned that very few quarries in India have so far been mechanized, but are mainly worked by manual labor; however, interest in mechanization is increasing.

New Plants

Since the end of the war A.C.C. has constructed one new plant with a capacity of 200,000 tons in Bihar State and has one of similar capacity under construction in Gujarat district in Bombay State. Further, four of its existing plants in India have been expanded. These new installations do not present many features of technical interest.

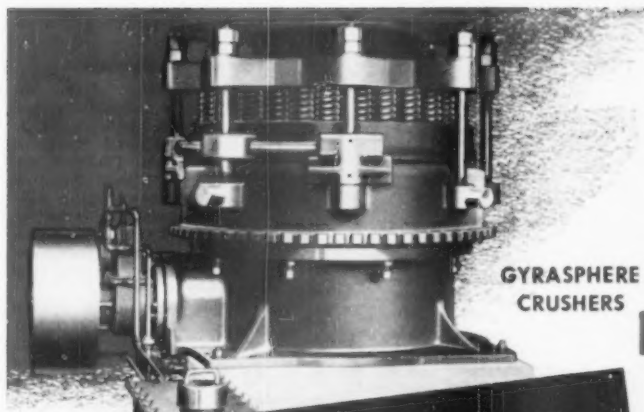
The Dalmia group is expanding two dry process operations by installing two 150,000 ton plants working on the wet process, and is building two new plants of 150,000 tons each—one in Rajasthan and one in Orissa. In the expanded operations and in the two new plants the kilns are 500-ton Unax units provided with slurry preheaters. The cement mills will have closed circuit grinding.

Two of the smaller companies are extending their plants with 200-ton kilns with slurry preheaters. The most interesting installations from the technical point of view are, however, the three new plants which came into production during 1949.

New Plants at Seeka

First to come into production was Shree Digvijay Cement Co.'s plant at Seeka near Jamnagar in Kathiawar. It is on the coast and its most important market is Bombay to which the cement is shipped by sea. It is provided with F. L. Smith & Co.'s machinery throughout. The most interesting feature is the raw materials, which are coral sand and clay. Coral sand is also being used as raw material in A.C.C.'s plant at Dwarka about

(Continued on page 148)



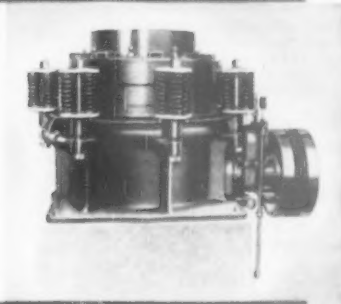
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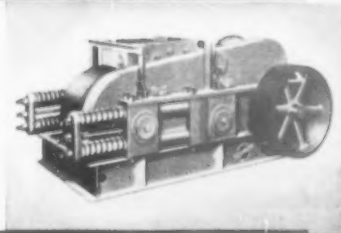
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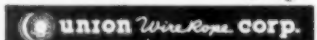
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60 miles from the plants at Seeka, but the Dwarka operation uses dry sand taken from the beach; the new plant uses sand taken below the high-tide mark.

Difficulties caused by alkalies have been very successfully overcome and the kiln, which is a 350-ton Unax unit provided with slurry preheater, produces excellent clinker.

Sand is taken from reefs near the coast which are dry at low tide and is loaded by hand into barges and shallow-bottomed boats. These are then run up on the beach near the plants at high tide and unloaded when the water has receded from the beach. The method is very characteristic of the primitive methods of transport still used in most Indian plants, and it is surprisingly cheap.

Rainfall in Kathiawar is scant and it was not considered necessary to cover the clinker storage; a slewing crane was therefore installed instead of the usual overhead traveling crane. The slewing crane provides in such circumstances greater storage space, and is cheaper. The kiln is oil-fired, the oil being imported through Port Okha and transported the 80 miles to Seeka in tank cars by rail. A coal mill is now being installed to allow for firing with pulverized coal as well, or with oil and coal simultaneously.

The clinker grinding mill is a 8.8 x 24-ft. Unidan two compartment mill which is in closed circuit with a rotary separator. The plant thus is equipped to produce cement of any fineness desired, but demand for special cements and even quick-hardening cement is not yet very great in India.

A separate power station supplies power to the cement plant and is also supplying electricity to the 20-mile-distant city of Jamnagar, most important city of the new State of Saurashtra.

The cement plants at Seeka are like most other cement plants in India, built in rather out-of-the-way places. It was therefore necessary to build a complete colony with bungalows for the management staff and quarters for the labor staff, water works, hospitals, canteen, club building and recreation ground, etc. This adds to the capital costs, but very few of the Indian cement plants are situated near cities.

Plant at Tinnevely

Built on very much the same lines as the plant at Seeka is the new cement operation at Tinnevely near the port of Tuticorin in South India belonging to The India Cements, Ltd. Raw material in this case is limestone, but the cement machinery is practically identical with that described above. The quarry is mainly worked by manual labor as is the custom in India, but the haulage to the plant, which is about two miles distant, is done by Caterpillar tractors with trailers. It is the first time this method of transport has been used in

the Indian cement industry, and it has already proved to be cheap and reliable.

Travancore Operation

The most interesting of the new plants in India is undoubtedly The Travancore Cements Ltd.'s plant near Kottayam in the United States of Travancore & Cochin. The raw material is a deposit of shell found on the bottom of Vembanad Lake near Kottayam. The shells are embedded in a layer of clay of varying thickness and the problem was to excavate the shells from the bottom of the lake and remove most of the clay.

This problem was solved by the company's consulting engineer, S. Rudinger, in cooperation with F. L. Smith & Co. The shells are excavated by means of a dredge provided with a specially designed movable cutter, which can be adjusted to the various depths of the lake and the various thicknesses of the layer of shells. The mixture of shells, clay and water is then pumped to a floating washing drum which cleans the shells effectively and loads the cleaned shells into self-propelled barges of about 50-ton capacity. The barges transport the shells the five miles to the plant where they are unloaded by means of a suction pump and delivered to dewatering bins.

From these bins, the shells are carried on belt conveyors to the raw mill which consists of a ball mill working in closed circuit with Hammer screens and a tube mill for final grinding. The kiln is a welded Unax unit with slurry preheater and can be fired with oil or coal or both; it is designed for an output of 150 tons per day.

There are no railways in this part of South India and all transport in and from the plant is by canal by small boats.

The country of Travancore and Cochin is covered by a network of canals and backwaters and it is possible by means of such water transport to cover practically the entire state.

The Future

In the postwar years numerous cement expansion plans have been under consideration, but many have failed to materialize—only those described above are now in operation or under construction.

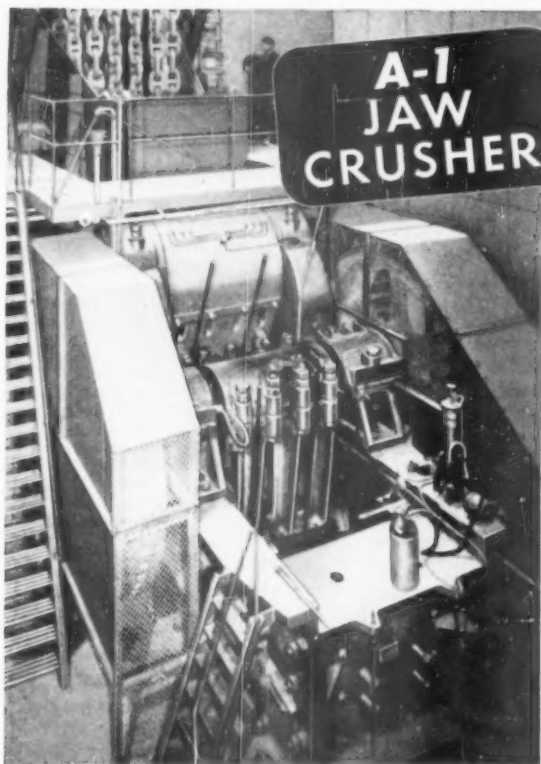
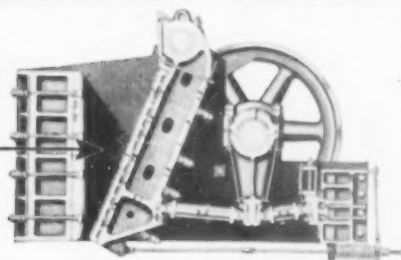
One or two more plans may materialize within the next few years, but it appears that capacity now under construction will be sufficient for some years to come. There is, however, possibility for further increase in the consumption figures.

Gravel Pit Changes Hands

THE GOODMAN SAND AND GRAVEL plant and pit, Mohridge, S. D., have been taken over by Virgil R. and David W. Jensen and are now being operated under the name, Mohridge Sand and Gravel Co.

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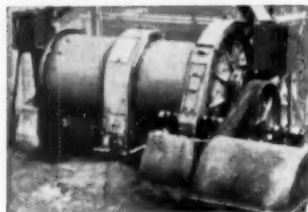
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Low Cost Plant

(Continued from page 82)

through his cab window and pulls a rope. By the time his cab has reached the spray, water comes from it and first thoroughly washes off the cab. The loads can be given a quick rinse to settle any dust that might be on the material, or the rock can be given a thorough rinsing. These factors are governed by the speed of the truck under the sprays. The water automatically shuts off when the truck has left, the unit operating on the principle of a modern flush toilet. It keeps the trucks and loads dustless and clean. This also keeps dust from blowing on highway.

Material from the plant is stockpiled by two large gantry cranes. One is a Colby (Seattle) and has a 100-ft. boom and swings a 3-cu. yd. clamshell; the other is a 4-cu. yd. American Revolver with a 135-ft. boom. The two cranes operate on the same rail system, and one can supply material to the ready-mixed concrete plant or to the black top plant; these plants are located at the more distant end of the track system. The gantrys can also pile aggregate or sand over the truck tunnels, each of steel construction 16 ft. in diameter, or it can lead the two 500-ton capacity truck bins and handle the No. 3 gravel. Most of the material is washed from a series of truck tunnels. An interesting feature here is that the gantry nearer the plant is so located that it can reach out over practically all the plant and pick up any piece of equipment to facilitate repairs. Large pieces of spare repair parts are kept piled neatly alongside the gantry's trackway.

Sand Handling

The sand is piled over one of the above mentioned tunnels. Concrete sand is at one end and masons sand at the other. The processing of the sand starts essentially with 5-x 14-ft. and 5-x 10-ft. Robins Gyrex double-deck screens in tandem. The minus 1/4-in. material goes to a company-made reciprocating rake classifier that is very rugged in its construction. Overflow from the rake goes to a 36-in. Wemco sand machine which is designed to take out more of the finer sizes. The rake and the sand machine both dump to an offbearing belt. The gantry stockpiles the sand for drainage and when it has drained sufficiently it is repiled over its reclaiming tunnel. This double handling insures a better blend and a drier product. Finer materials recovered in the settling ponds and which have had sufficient time to dry out are recovered and used in the hot mix plant. Nothing is wasted. There is no clay in either fine or coarse sand.

Tailings from the plant flow to a part of the pit near the plant. Before tailings were admitted to the area a 24-in. slotted pipe was sunk 16 ft. into the bed of this pit. The tailings were then admitted to the pit

and at time of inspection this pipe had been buried an additional 40 ft. The top of this pipe still extended above the water line several feet. The company foresees that someday this pipe will house a deep well pump to supply additional plant water, should it be needed. The tailing line to the pond is buried.

The two 500-ton tanks for No. 3 gravel previously mentioned are side by side and a truckway beneath them. Alongside and parallel to this truckway is a second truck road. A steel spout extends out of the side of these bins so that two trucks can load from the same bin at the same time. It takes about 12 sec. to load 12 tons of the No. 3 gravel to one truck.

Excessive sizes of rock, or any material that might be contaminated due to a hole in a vibrating screen or otherwise, can be trucked to a separate hopper and an offbearing belt delivers the material to one of the Symons cone crushers that is a part of the secondary crusher set-up. There is a 3-ft. and a 4-ft. standard Symons cone. Final reduction crushers used include 322-R Allis-Chalmers gyratory, a 3-ft. standard Symons Cone, a 4-ft. Telsmith Gyrasphere and a 5 1/2-ft. Symons short head.

Other Features

Two repair shops are available; one for the truck equipment and one for the plant. Power is purchased from the Southern California Edison Co. and 2300-volt current used on the shovel, gantrys and larger motors. Separate meters are provided for power not used in the plant (office, garage, shops, etc.) and this deducted from the master meter shows what the plant is using. Capacitors have been installed. One installation of these was said to have cost \$7000, but it saved \$175 per month thereafter. In general, all motors over 100 hp. have 2300-volt power, and those less than 100 hp. have 440-volt current, although this rule is not strictly adhered to.

Other operating features at the El Monte plant include a 10-wheel truck with tank which is kept in constant use during plant operating hours wetting the roads to keep down dust. The field engineer has a helper and a panel truck, as well as test laboratory equipment which is available. Under development is a ready-mixed concrete truck assembly that will include a trailer along with the conventional roller unit. Meters in substation show any grounds in the cables to the gantrys or the shovel in the pit. There is an operating station high in the plant assembly so the operator can see what is going on more easily. Mobile telephone equipment in Paul Graham's automobile enables him to keep in touch with the company's new operation on Catalina Island. Redesigning and rebuilding of truck equipment, ready-mixed concrete roller equip-

(Continued on page 152)

"We have found our MURPHY DIESELS
dependable, efficient and economical."

Says: W. E. LAMBERT
Pres., Lambert Bros., Inc.



MORE output at less cost is what you get with dependable Murphy Diesel Power... and that's what makes bigger profits for you. Like so many crushed stone contractors, Lambert Bros., Inc., with headquarters at Knoxville, Tenn., found this to be the case. But read what Mr. W. E. Lambert, President, has to say about their Murphy Diesels—

"In connection with our twelve quarry operations in five southern states, we have a large number of Murphy Diesels of different sizes. Some of them have been in operation eight or ten years. We have found them dependable and efficient, and economical as to fuel consumption and up-keep."

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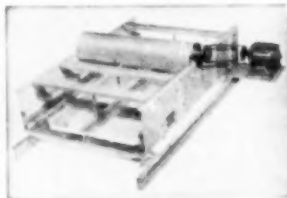
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ment for better haulage service are other features.

Also featured in the plant is a 5- x 12-ft. dry, double-deck Gyrex scalper, a 5- x 14-ft. Robins screen, and two 4- x 8-ft. triple-deck Stephens-Adamson screens in tandem in the crushed gravel assembly. A 4- x 12-ft. double-deck, wet Robins Vibrex screen is in the gravel section. This screen follows the previously mentioned wet tandem Robins Gyrex.

Personnel

Paul C. Graham is president of the company, and Russell C. Graham is vice-president and general manager. Other personnel include Charlton Dunn, Jr., production manager, I. W. Newport, plant superintendent, J. S. Abrams, plant manager, and L. I. Johnstone, vice-president in charge of sales and engineering.



Weighing only 6000 lb., the power unit couples to any standard rail car and is capable of exerting a drawbar pull of up to 7350 lb., sufficient to pull a load of up to 450 tons

"Trackmobile" Speeds Car Handling

INDUSTRY'S BIG JOB of hauling, spotting and switching of railroad cars in and out of plants may be rendered much easier with the introduction of the newly-developed "Trackmobile" unit of the Whiting Corp., Harvey, Ill. This small and compact and yet unbelievably powerful gasoline-powered traction unit derives its tractive power by the ingenious use of an hydraulic jack which gives the unit a pulling power many times that of the Trackmobile's weight of only three tons. This development may revolutionize yard and in-plant methods of car handling.

The ability to operate as a tractive unit either on the ground or on railway tracks and to change from one to the other in 30 seconds gives the unit a versatility and efficiency that is remarkable and which renders it extremely useful in the car handling operations of industrial plants, quarries, mines and docks.

The Trackmobile unit couples to any standard railway car. When coupled, its hydraulic jack raises the coupler, absorbing some of the car's weight and forcing the Trackmobile down on the track to afford tremendous traction. By thus transferring part of the car's weight to the traction unit, a drawbar pull of up to 7350 lb. is developed, which means that the little unit can move a load of up to at least 450 tons.

Four standard AAR steel wheels are used, and four rubber-tired wheels for ground travel are hydraulically retracted when the unit is positioned for track operation. One operator easily controls transfer from one set of wheels to another. The unit is capable of ground speed of 25 m.p.h. and a track speed of 20 m.p.h. Track speed, of course, varies with the load in hauling.

The unit is powered by a 60-hp. gasoline engine. Its controls include four speeds in either direction. It is equipped with a sand chamber. The unit is 7 ft. wide and 9 ft. long and can be operated wherever a rail line is situated or wherever a truck can operate. The hydraulic jack of the Trackmobile can exert a lift on the car drawbar of 46,000 lb. The unit is equipped with a mechanical brake, drive shaft mounted, with ample capacity to hold the load under normal operating conditions.

A remarkable demonstration of the unit was held at the Grand Central Station in Chicago on November 15, with representatives of the press, the military, and the railroads present. The Trackmobile gave a hauling demonstration, a feature of which included the hauling of a train of five standard railroad box cars, two standard railroad passenger coaches, plus a 125-ton diesel switching engine.

Clinker Cooling

(Continued from page 190)

cept Anselm's stated average of 66 percent.

It is also difficult to understand how Anselm reached the conclusion, or how he can prove, that a brick lined rotary cooler of a certain size will produce the same clinker exit temperature as can be obtained with an unlined cooler of the same size. If there is no difference in heat dissipation between shells with free radiation and those with restricted radiation, why then would operators water cool rotary cooler shells to reduce clinker discharge temperature and apply special insulating material in cases in which heat is to be conserved?

Lepol kilns having smaller fuel requirements logically require less combustion air, but operate with a higher preheat after the smaller amount of secondary air passes through the cooler. For this reason three out of four Lepol kilns in the U. S. are equipped with Fuller air quenching coolers.

The great majority of American Fuller air quenching inclined grate coolers are operated without dust collectors by dimensioning the vent stacks for low velocity venting of part of the cooling air. In cases in which clinker breakers are attached to Fuller coolers, the installation of dust collectors is recommended.

The type of firing system has nothing to do with the type of cooler applied, but for the unit pulverizer system, the Fuller air quenching inclined grate cooler is well liked because of the ready availability of waste heat for the drying-grinding in the unit pulverizer. Any difference in flame temperature due to combustion of wet coal is entirely a matter of fuel consumption to which the combustion air supply from the cooler can be made highly responsive. The writer is fully aware of the higher power cost in Europe. The savings which can be expected from improvement to grindability have been discussed by the writer in the first part of this article, and those savings will be in terms of the same high power cost.

It is to be hoped that the above information will help to clarify any misunderstandings which may have existed in Mr. Anselm's mind concerning the performance of Fuller air quenching inclined grate coolers.

Opens Stone Quarry

SHAWNEE STONE CO., Worthington, Ohio, recently completed its new stone plant which is located near the Scioto River and O'Shaughnessy dam. The company will specialize in agricultural limestone and will also produce road and driveway stone. J. Lyons is president of the company and I. J. Horsch is secretary and in charge of office detail and sales.

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The **HI-SPEED**
Belt and Bucket Elevator
that costs less to own and cuts
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CEMENT PLANTS . . . YARDS

Built by production line methods to slash manufacturing costs! Standard length sections and head and boot assemblies are adaptable to the requirements of any permanent or temporary installation.

Large capacity . . . heavy duty. Lifts sand, gravel, other aggregates from 20' to 30' — up to 90 tons per hour. Ruggedly built of high tensile alloy steel.



MOVE Baughman CONVEYOR TEAMS ANYWHERE!

Whatever your materials handling problem, BAUGHMAN has the answer. There are unlimited variations and combinations possible in BAUGHMAN equipment — horizontal belt conveyors to any length . . . heavy duty, light duty and inclined elevators . . . auger type and belt type conveyors adjustable to any angle. All equipment is either completely portable or easily disassembled for re-location at any time.



MODEL Q AUGER CONVEYOR

Loads, unloads, conveys any material that becomes fluid in movement . . . from the horizontal to 60°. Volumes from 15 to 50 cu. ft. per minute depending on material conveyed. Positive direct drive. For portable or stationary installations. Available with or without wheels . . . with hopper or in combination.



MODEL 230 BELT CONVEYOR

Another "Hi-speed" product that's long on service and short on price. Pre-fabricated by assembly line methods . . . assembled from standardized units. Result: a ruggedly built conveyor you can well afford to buy. Conveyor illustrated is 30' long, composed of one 20' section, one 7' tail and one 3' head section, from stock. Gasoline or electric power. Portable or stationary.

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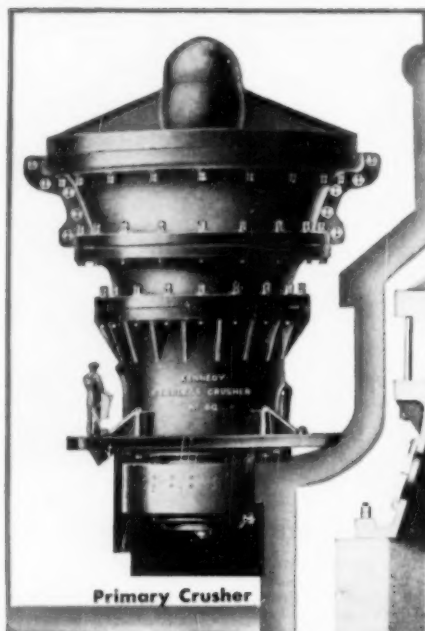


LET'S

TALK ABOUT A REAL CRUSHER

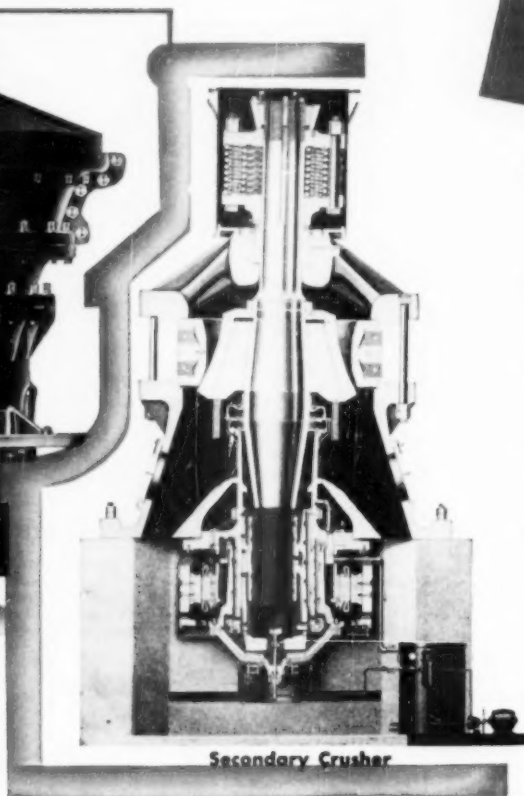
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Designed and built to produce, economically and consistently, maximum loads of uniform products. Assures efficient service with minimum "time off for repairs" under the most severe operating conditions.

Costs less in the long run because it has a larger capacity; uses less power; holds repair bills to a

minimum; produces more and better rock tonnage, faster and at lower cost.

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INFORMATION

TO HELP YOU MEET TODAY'S PROBLEMS AND TO MAKE PLANS FOR TOMORROW

You can obtain catalogs listed on these pages by merely checking and mailing the coupon below

- 1 **AGGREGATES**—The Wayliffe Co. has published a 20-page booklet on Wayliffe concrete masonry units for exterior and interior finishes, back-up walls and partitions, and floor and ceiling construction for all types of buildings. Construction details, physical characteristics of Wayliffe aggregates, and design data are given, also information on use of Wayliffe for plain and reinforced concrete, and roof and floor tiles.
- 2 **ASPHALT PLANT**—Pioneer Engineering Works has issued Form 620, describing and illustrating Model 101 continuous process asphalt plant with a rated capacity of 110 to 135 t.p.h. Construction features, cut-away drawing showing material flow through plant, etc., are also given.
- 3 **BATTERIES**—Gould Storage Battery Corp. announces six data sheets for selecting correct motive power batteries for industrial trucks and mine locomotives and shuttle cars. Cutaway illustrations, specification data, table of battery sizes, cell dimensions and shipping weight are also included.
- 4 **BEARINGS**—Engineering Societies Library has published a bibliography, entitled *ESL Bibliography No. 6*, on the manufacture, design, properties, wear, lubrication, performance, testing and applications of non-metallic bearings. It contains 101 selected references to literature of the past 12 years and may be purchased from the Library, 29 W. 39th St., New York 18, N. Y., for \$2.00.
- 5 **CONTROLLERS**—Fischer & Porter Co. has released a 28-page catalog, No. 50, describing and illustrating new developments in exhibiting and controlling flow instruments for all industries, such as flow indicators, recorders, integrators and a new pneumatic controller unit. Also discussed is the "Magnahond" magnetic clutch and the electric impedance bridge transmitting systems. Cross sectional views, schematic diagrams and construction details are included.
- 6 **CONVEYORS**—Barber-Greene Co. has published an 8-page bulletin, No. 374, describing and illustrating Model 374 heavy-duty portable belt conveyors, ranging in capacity from 150 to over 425 t.p.h., for handling large quantities of sand, clinders, stone, etc. Construction features, typical applications, and accessories such as feeders, screens, hoppers, etc., are also shown.
- 7 **CONVEYORS**—Rapids-Standard Co. has released a 24-page catalog, GC-51, containing application tips, construction features, and specification charts for use in solving material handling problems. Gravity conveyors, powered conveyors, and hand and platform trucks are treated in separate sections.
- 8 **CRUSHERS**—Pioneer Engineering Works, Inc. has released a 16-page bulletin, Form No. 617, describing and illustrating Continuous twin and triple roll crushers for use in the gravel, rock, agricultural limestone and mining industries. Selection tables, dimension and foundation data, charts, cut-away views and typical installations are also given.
- 9 **CRUSHING & SCREENING PLANTS**—Smith Engineering Works has issued Catalog No. 278, describing and illustrating dual portable plants for crushing, screening and loading. On-the-job photos and typical dual plant combinations are shown.
- 10 **DIESELS**—GMC Truck & Coach Div., General Motors Corp. has released a pamphlet in the form of an information "Quiz," on diesel engines used in GMC trucks. Answers are given to such questions as "What is 2-Cycle?", "Are Diesels Hard to Start?", "What is the Fuel Injection Pressure?", "Why Use a Governor?", and others.
- 11 **DRILLS**—Joy Mfg. Co. has released Bulletin D-28, describing and illustrating the 22 HD heavy-duty diamond core drill, a 2000-ft. capacity drill driven by gasoline, electric, or compressed air and mounted on truck, steel skids, or underground column.
- 12 **DRIVES**—Link-Belt Co. has published an 88-page bulletin, No. 2274, describing and illustrating P.I.V. variable speed drives, available in eight sizes and 18 types, in $\frac{1}{2}$ - to 25-hp., with manual and automatic controls. Diagrams and typical installations are shown.
- 13 **DUST COLLECTORS**—American Wheelabrator & Equipment Corp. has made available an 8-page bulletin, No. 252, describing and illustrating cloth tube type dust and fume collectors for use in the mining and metallurgical industries.
- 14 **ELECTRODES**—Leeds & Northrup Co. has issued a 28-page Catalog EM-58, describing and illustrating pft electrodes and assemblies for industrial and laboratory applications, also instruments for measuring pft such as permanently-mounted and portable potentiometers. Indicators, recorders and controllers are also shown.
- 15 **EXCAVATORS**—Marion Power Shovel Co. has issued Bulletin No. 400, describing and illustrating Type 43-M all-purpose 1-cu. yd. excavator for use in quarrying, underground work, construction, bridge and road work, etc., and also lists and illustrates varied applications as a shovel, dragline, clamshell, crane, backhoe and pile driver.
- 16 **HARD-FACING**—Air Reduction Sales Co. has released a 20-page catalog containing detailed information on hard-facing alloys. Description, typical uses, mechanical properties, chemical analyses and recommended procedures are included.
- 17 **HARD-FACING**—Haynes Stainless Div., Union Carbide & Carbon Corp. has released a 40-page hard-facing manual as a helpful guide in prolonging the life of parts and equipment. It describes how to select the right alloy; which welding process to use; and gives information on properties and available sizes of 12 hard-facing materials, also typical applications.
- 18 **HOISTS**—Joy Mfg. Co. has issued a 16-page bulletin, 78-X, describing and illustrating various types of hoists in capacities ranging from 500 to 3500 lb., for use in mines, industrial plants, construction jobs, and oil fields. Hoists can be driven by Turbinaire, Pistonair, electric, or gasoline engines. Specifications and selection chart are also given.
- 19 **INSULATION**—The Celotex Corp. has released a manual for architects, engineers, designers and maintenance engineers, covering design and construction application data of Celotex, a structural insulating panel unit. Detailed drawings, various applications of Celotex, structural load design tables, etc., are included.
- 20 **JOINTING COMPOUND**—Atlas Mineral Products Co. has announced publication of a 4-page bulletin, No. M20-1, describing and illustrating G-K sewer joint compound. Directions for use and tables showing quantities required per joint of sewer pipe are also given.
- 21 **LIFT TRUCKS**—Mobilift Corp. has released a 9-page bulletin, Form M-410, describing and illustrating Models E and ER, 2000-lb. capacity, Lev-R-Matic drive fork lift trucks. Specifications and construction features are also given.
- 22 **LOCOMOTIVES**—Flynouth Locomotive Works, Div. of Fate-Reet-Heath Co. has issued a 44-page catalog describing and illustrating various types of gasoline, diesel and diesel-electric locomotives ranging in size from 2½ to 75 tons and made in both standard and narrow gauge. Specifications and capacities are also given.

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23 LUBRICATION—The Texas Co. covers the subject of viscosity of lubricating oils in the May and June, 1959, issues of its "Lubrication" magazine. The first article illustrates the simplest concept of streamline flow between two surfaces having relative motion. Part II covers streamline flow in capillary and other small tubes, and Part III covers turbulent flow as usually encountered in pipes.

24 MATERIAL HANDLING—Electric Industrial Truck Association has published a 72-page Handbook of Material Handling, supplanting the former handbook published by EITA. Illustrations, charts, diagrams, and engineering data are included. Handbook is divided into four sections: Evaluation of Industrial Truck Handling; Material Handling Management; Organization of Industrial Truck System; and Practical Truck Engineering. Price is \$1.00.

25 METAL HOSE—Universal Metal Hose Co. has issued a 12-page catalog, No. U-101, describing and illustrating various types of metal hose, tubing and fittings for conveying solids, fluids or gases at elevated pressures and temperatures. Hose diameters range from 1/8 in. to 30 in. Typical applications, specifications, cross section views and construction details are included.

26 MIXERS—Fraschak Machine Co. has issued a 12-page catalog describing and illustrating concrete products machinery, including mixers, conveyors, elevators, block machine, silo stove machine, cinder crusher, and lift trucks. Construction details, reference table for weights of cement, concrete, crushed stone, gravel, lime, sand, etc., are also included.

27 PAINT—Medusa Portland Cement Co. has published a color chip folder containing new colors available with Medusa rubber base paint for concrete floors, interior masonry walls, plaster walls, cement asbestos shingles and siding. Instructions on how to use the paint are also given.

28 PAINT—Specn, Inc. has published Bulletin P & P 1002-B, descriptive of Rustrem anti-rust paint which it is said can be ap-

plied over rust without wire brushing, scraping or sand-blasting. It is available in clear, black and aluminum. Other products described are Heat-Rem heat resisting aluminum paint; Chem-Rem chemical resistant black paint and Wood-Rem wood preservative paint.

29 PUMPS—Allis-Chalmers Mfg. Co. has released Bulletin 52-B-614-OB, describing and illustrating various types of centrifugal pumps in ratings from 10 to 500 g.p.m. at heads to 220 ft., and ranging in size from 1/4 to 10 hp. Pumps are available in drip-proof, splash-proof, totally-enclosed fan-cooled or explosion-proof types. Design and construction features are shown.

30 PUMPS—Goulds Pumps, Inc. has published Bulletin 636.1, describing and illustrating various types of self-priming centrifugal pumps in sizes ranging from 1/4 hp. to 5 hp. with both open and closed impellers. Construction features, operational data, specifications and dimensional diagrams are also given.

31 PUMPS—The Jaeger Machine Co. has published Catalog P-10, describing and illustrating gasoline- and diesel-powered deepwater pumps in 1 1/2- to 10-in. sizes; pressure pumps in 2- to 8-in. sizes for pressures to 275 p.s.i.; and electric pumps in 1 1/2- to 10-in. sizes. Specifications, conversion tables, charts and other useful data together with illustrations and description of the Jaeger well point systems are included.

32 PUMPS—A. R. Willey & Sons, Inc. has announced Catalog No. 200, describing and illustrating various types of Model K centrifugal sand pumps. Construction features, dimensional drawings, tables and charts are also given.

33 ROCK BITS—Rock Bit Sales & Service Co. has issued a 20-page pocket-size book, describing and illustrating various types of Rock-Bits. It also shows how to successfully recondition tungsten carbide bits and contains many helpful operating suggestions for drillers on obtaining maximum speed and footage out of carbide bits.

34 RUST PREVENTION—Rust-Oleum Corp. has released a catalog covering various kinds of service and applications for industrial rust prevention on machinery and implement finishes, heat-resistant and chemical-resistant coatings, floor coatings, etc. Sealers for materials other than iron and steel are also featured.

35 SAND MACHINES—Western Machinery Co. has published Bulletin No. C-1-0-2, describing and illustrating sand preparation machines for washing, desliming, dewatering and sizing sand. Construction details, dimensional drawing, capacity table and list of users are also given.

36 SEPARATORS—R. P. Adams Co., Inc. has published an 8-page bulletin, No. 176, describing and illustrating aftercoolers and cyclone separators and Poro-Stone air filters for removal of water, oil and pipe scale from compressed air systems. Cutaway views, prices and dimensions are included.

37 SHOVELS—The Thew Shovel Co. announces a new catalog describing and illustrating the Lorain-50 series of power shovels and cranes in the 1 cu. yd. class, equipped with a hydraulic coupling as standard equipment. Four different size crawlers are available in this series as shovel, dragline, clamshell, crane and hoist. Another catalog describes and illustrates the Lorain-TL series of shovels and cranes in the 1 1/2 and 2 cu. yd. classes, which may be mounted on crawler and rubber tire mountings, and includes Self-Propelled and Moto-Crane models. Many combinations are explained in detail in this catalog.

38 SPEED REDUCERS—The Cleveland Worm & Gear Co. has released Bulletin 130 describing and illustrating types AT and RT speed reducers. Horsepower rating tables, efficiency curve, dimensions, diagrams, and construction details are also given.

39 TRACTORS—Caterpillar Tractor Co. has released a 32-page booklet, Form 12770, entitled "Building with Caterpillar," giving first-hand information and illustrations on road construction, dam building, airport and railroad maintenance, pit and quarry work, pipeline jobs, erection work, drilling, logging and stream control.

40 TRACTORS—International Harvester Co. has announced Catalogs A-153-NN and A-154-NN, describing and illustrating the TD-14A and TD-18A crawler tractors, respectively. Sectional views, diagrams and construction features are also shown.

41 TRUCKS—Hyster Co. has issued an 8-page catalog, Form 1138, describing and illustrating five models of the Salisbury turret trucks for horizontal materials handling of loads up to 4000 lb. Shown are the pallet, tug, platform, cargo and auto-loader trucks. Specifications, typical applications, cutaway view of power unit, and diagrams are also given.

42 TRUCKS—Lyon-Raymond Corp. has issued Bulletin 701, describing and illustrating three models of the riding type Space-Maker electric tiering truck. The pallet models are designed to handle 2000 lb. at 24-in. load center and the skid model will handle 2000 lb. and 4000 lb. Specifications and typical applications are also shown.

43 WIRE ROPE—Macphay Co., 4-page bulletin, called the Monarch White Strand Bulletin No. 50-25, describes and illustrates improved plow steel wire rope. All sizes and construction classifications are combined in one large table. Information on ordering wire rope, specifications, etc., are also given.

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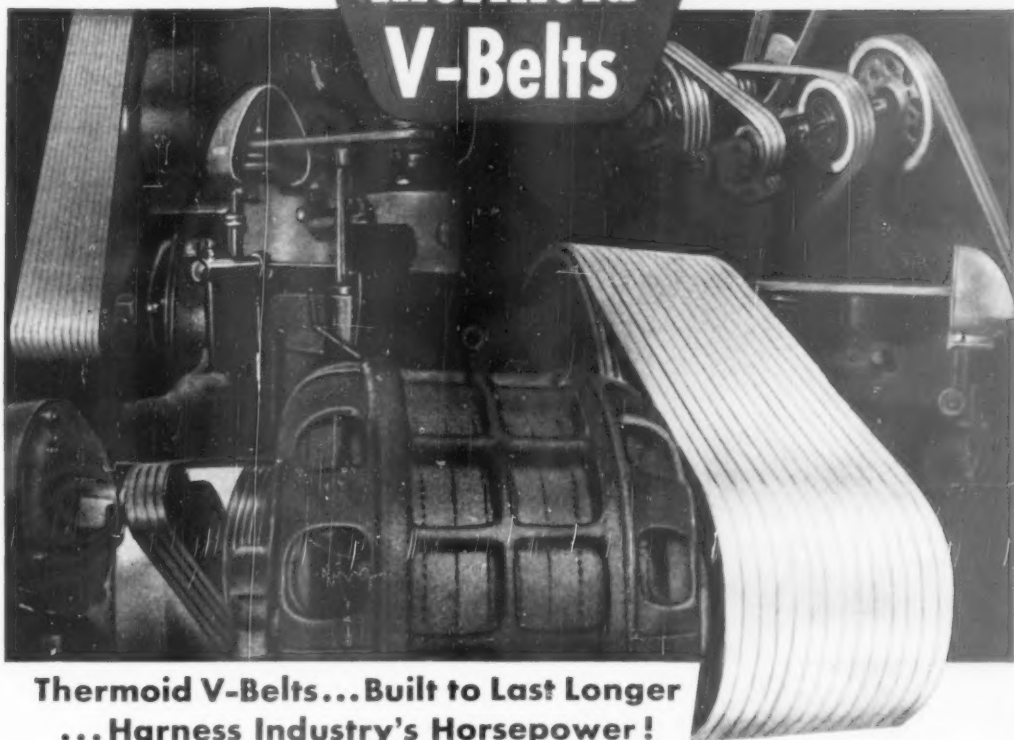
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Crushing Practice

(Continued from page 129)

chine, its product comparing quite closely to that of the former type, for equal close-side settings.

Probably the outstanding feature of the Hydrocone crusher is the hydraulic support, from which its name is derived and which is clearly shown in the sectional view. This device makes it possible to adjust the crusher to any desired setting within its range in a matter of seconds; adjustments may be made while the crusher is running, although the feed must be shut off before operating the adjusting pump. An accumulator in the hydraulic system provides protection against tramp iron or packing.

Fig. 9 shows a diagram of the Hydrocone crushing chamber. A comparison of this chamber with those previously discussed is interesting. It will be noted that the choke-point has been raised far above the discharge level, in fact, to a point not far below the nip-point for the recommended maximum one-way feed dimension. By virtue of the decided flare of the head, and the corresponding flare of the top shell bore, the line-of-mean-diameters slopes sharply away from the crusher centerline. For some distance above the discharge point the angle between head and concave is very acute; in fact, at the open-side position of the head this zone is almost parallel.

For recommended operating conditions, i.e., for safe combinations of throw and setting, and with screened feed, this type of crushing chamber does not approach anything like a choke or near-choke condition. For the combination shown in the diagram the ratio of volume reduction is almost 1:1 from zone 0-1 to zone 2-3 at the choke-point; consequently, if the crusher is given a screened feed (as all fine-reduction crushers should be) the reduction in voids by the time the choke-point is reached cannot very well reach serious proportions.

The diagram shows the standard chamber. With screened feed these crushers will operate at close-side discharge settings equal to the throw of the head at the discharge point (usually spoken of as "eccentric-throw").

Medium or Fine Crushing Chamber

This crusher is a modification of the standard machine, developed for fine-crushing duty. Mechanically the machine is the same in every respect as the standard crusher of the same type, but for each developed size of machine a special top shell and concave ring has been designed, with reduced receiving opening, reduced angularity between head and concave, and, consequently, superior characteristics at the finer settings. Medium crushing chambers may be operated at close-side settings of one-half the eccentric-throw, on screened feed; hence capacities at the finer settings

are better than those of the standard type. Fine crushing chambers operate at one-fourth the eccentric throw. Inasmuch as the maximum feed-size is smaller in the case of the fine chamber, the ratios of reduction are approximately the same for both machines.

(To be continued)

Labor Relations Trends

(Continued from page 67)

One of the few cases on record where a crushed stone operation has applied for and been granted seasonal exemption from the Fair Labor Standards Act (Wage and Hour Law) is that of the Blue Stone Quarry, Inc., Acushnet, Bristol county, Mass. The new exemption became effective November 28. The findings were: (1) This plant normally shuts down for a period of approximately six months a year, except for small shipments shortly before the production season opens in the Spring; (2) the plant is located in counties included in the northern part of the industry, specifically described in the terms of the exemption (which, incidentally, was obtained through the activities of the National Crushed Stone Association, several years back); (3) the plant ceases operations regularly each winter except for sales, maintenance and similar work because the materials used are not available for excavation, handling and processing in the form in which they must be in order to be salable, on account of the climatic conditions.

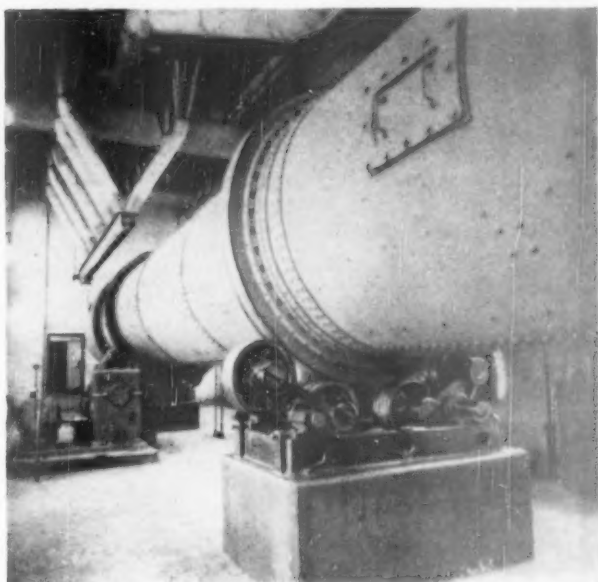
National Metal Show

THE NATIONAL METAL SHOW was held in Chicago, Ill., October 23-27. The show consisted of exhibit displays and technical sessions. Among papers presented at the technical sessions were: "New Production Applications of Hard Facing," by Eldon C. Hart, Haynes Stellite Division, Union Carbide and Carbon Corp.; "Commercial Flame-Hardening," by F. J. Cox, Pittsburgh Commercial Heat Treating Co.; and "Production Flame-Hardening," by Milton Garvin, Cincinnati Milling Machine Co.

Trace Element Study

MISSOURI STATE GEOLOGIST representatives have collected several hundred limestone and dolomite samples from both active and inactive quarries and from undeveloped deposits in different areas of the state for purpose of studying trace elements. These samples are being tested by the University of Missouri Agricultural Chemistry Department. After this study has been completed, limestone producers will have a comprehensive picture of Missouri's stone deposits. Results of this study will be published as soon as the project has been completed.

CEMENT OPERATORS LICK WET COAL PROBLEM WITH ROTARY DRYERS



A Double-Shell "XA-12" Ruggles-Coles Rotary Dryer drying coal in a cement plant, ahead of pulverizers.

Many cement plant operators are reporting increasing difficulty in pulverizing coal for their kilns, due to higher moisture content in the coal now available, since lower-grade, finer coal, with moisture-retaining properties is now being slumped on the market.

Operators have solved this problem by using Ruggles-Coles rotary dryers ahead of the pulverizers. For instance, one ce-

ment plant operator has just installed an "XA-12" Double-Shell Ruggles-Coles Rotary Dryer near his outside coal storage pile, with a by-pass arrangement for use in dry seasons. Capacity of the dryer is 17 tons per hour, reducing moisture from 15% to 6%, or from 10% to 3%.

Another cement firm bought two Double-Shell "XA-10" Ruggles-Coles Dryers recently, for their coal preparation plant storage system.



Sectional view of "XA" Dryer showing double shell and hot-gas travel. For full information about Ruggles-Coles Rotary Dryers, write Hardinge Company, Inc., for Bulletin 16-D-7.

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Letter to the Editor

Dear Editor:

Dr. Gottlieb's ideas [in the article "Production of Blended Cement," August, 1950, p. 174] are very thought-provoking. There is a great deal yet to be learned on better methods of utilizing the potential binding power of portland cement clinker and the author has given some valuable suggestions.

In making comparative tests on blended vs. straight cements, certain criteria should be followed to insure results that can be definitely interpreted. The same clinker should be used and pains should be taken to get identical size distributions. Otherwise, potential variations in results may seriously interfere with the reliability of the conclusions that can be drawn.

In talking about density and durability, Dr. Gottlieb has given consideration to possible chemical attack by aggressive solutions and he is quite correct in tying this in with density. However, the damage to concrete produced by freezing is by means of the hydraulic transmission of the pressure forces produced by expanding ice crystals. In such event a dense structure may be very harmful.

The value of the article would be greatly enhanced by disclosing the specifications for the aggregate to be blended with the fine cement.

It has been shown¹ that greatest density and highest strength results can be obtained with a logarithmic size distribution in the cement. This means equal amounts in the ranges, 80 to 40 μ , 40 to 20 μ , 20 to 10 μ , 10 to 5 μ , and 5 to 2.5 μ .

It was also found that replacing the large cement grains of a given grading by quartz silica resulted in lowered packing and reduced strength. The clinker grains, while corresponding closely in degree of irregularity with the quartz silica grains, seem to have their corners rounded off during the mixing operation to produce a better packing.

This experiment of Dr. Gottlieb's should be repeated with his porous aggregate, first separating the clinker into narrow fractions and then recombining.

Dr. F. O. Anderegg,
John B. Pierce Foundation,
Raritan, N. J.

¹F. O. Anderegg, "Particle Size Distribution of Portland Cement and What It Means," Rock Products, September, 1946.

National Lime Safety Competition

INJURY-FREE RECORDS were attained by 16 of the 46 plants enrolled in the 1949 National Lime Association Safety Competition, conducted by the Bureau of Mines. Certificates of Honor were awarded by the National Lime Association to the winning plants. This was one more award than in the 1939 contest which had the previous largest number of awards since the

competition was started in 1935. Also, the injury severity rate for the 1949 contest was the second lowest annual rate in the history of the competition, the lowest being in 1948. The injury frequency of 20.568 per million man-hours at the 46 plants was the best achieved during the 15 years of the competition.

The 16 lime plants receiving Certificates of Honor were:

Quarries with calcining plants working 100,000 man-hours—

Cedar Hollow plant, Devault, Penn., operated by the Warner Co., 359,918 man-hours.

York plant, York, Penn., operated by the National Gypsum Co., 226,638 man-hours.

Natividad plant, Salinas, Calif., operated by the Kaiser Aluminum and Chemical Corp., 200,800 man-hours.

Evans plant, Evans, Wash., operated by the U. S. Gypsum Co., 125,348 man-hours.

Quarries with calcining plants working less than 100,000 man-hours—

Thomasville plant, Thomasville, Penn., operated by the J. E. Baker Co., 95,393 man-hours.

Berkeley plant, Martinsburg, W. Va., operated by the North American Cement Corp., 89,935 man-hours.

Ripplemead plant, Ripplemead, Va., operated by the Ripplemead Lime Co., Inc., 56,160 man-hours.

Thomaston plant, Thomaston, Maine, operated by the Lawrence Portland Cement Co., 37,661 man-hours.

Frederick plant, Frederick, Md., operated by the Shank and Etzler Lime Co., 23,920 man-hours.

Underground mines with calcining plants—

Bellefonte plant, Bellefonte, Penn., operated by the National Gypsum Co., 362,478 man-hours.

Bakerton plant, Bakerton, W. Va., operated by the Standard Lime and Stone Co., 220,840 man-hours.

Hannibal plant, Hannibal, Mo., operated by the Marblehead Lime Co., 75,625 man-hours.

Marblehead plant, Marblehead, Ill., operated by the Marblehead Lime Co., 51,536 man-hours.

Calcining plants only—

Thornton plant, Thornton, Ill., operated by Marblehead Lime Co., 36,302 man-hours.

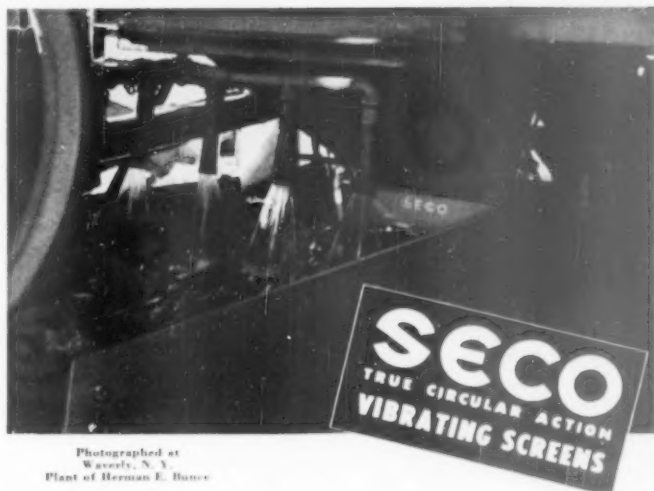
Plymouth Meeting plant, Plymouth Meeting, Penn., operated by the Phillip Carey Manufacturing Co., 33,600 man-hours.

Houston plant, Houston, Texas, operated by the Nyotex Chemicals, Inc., 24,746 man-hours.

Seeks Cement Plant

EGENIO MENDEZA, a Venezuela business man and former Minister of Development, recently came to the United States for the purpose of purchasing a cement plant for Venezuela.

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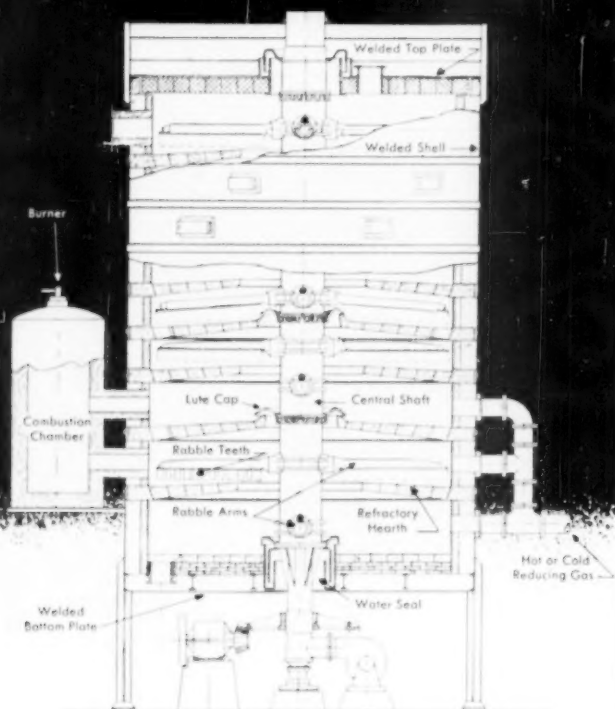
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Sand and Gravel Safety Competition

THE VAN SEIVER PLANT of the Warner Co., at Tullytown, Penn., the Talton plant of the Texas Construction Material Co. at Alleyton, Texas, and the Thomas plant of the Fort Worth Sand and Gravel Co., Inc., at Birdville, Texas, won top safety honors in the twenty-first National Sand and Gravel Association Safety Competition conducted by the Bureau of Mines. These operations were awarded the trophies, provided by Rock Products, for having achieved the best safety records in the three groups of sand and gravel plants in the competition. In addition to the trophy awards, 22 sand and gravel operations have been awarded Certificates of Achievement in Safety by the Bureau of Mines for having operated throughout 1949 for 20,000 or more man-hours without any disabling injuries. The trophies will be awarded the winning plants at the National Sand and Gravel Association convention in New Orleans, La., February 11-15, 1951.

The Van Seiver plant, a dredge operation of the Warner Co., was injury-free during a total operation of 433,245 man-hours during 1949 in the competition for plants operating more than 100,000 man-hours. The trophy award for its safety achievement in 1949 is the seventh such award to the plant, which has been enrolled continuously in the competition since 1930. The other trophy awards won by the Van Seiver plant were in 1931, 1932, 1933, 1934, 1935 and 1939. Each of the trophy awards was for injury-free operation.

The Talton plant of the Texas Construction Material Co. received the award for its injury-free record during a total worktime of 93,720 man-hours during 1949 in the competition for plants operating 50,000-100,000 man-hours. The trophy award in 1949 was the first to this plant, which has been entered in the contest since 1946. It achieved its first injury-free year for this period in 1949. In this group there were five other sand and gravel operations that operated throughout the year without any disabling injuries. However, the record of the Talton plant was the best, as it operated the most man-hours without any injuries.

The Thomas plant of the Fort Worth Sand and Gravel Co., Inc., won the Rock Products trophy in this group for operating a total of 43,928 man-hours without any lost-time injuries during 1949 for plants operating less than 50,000 man-hours. This is the first trophy award to the plant, which has been enrolled for the past three years. In 1947 the plant also had injury-free operations throughout the year but its man-hours of exposure were not sufficient to win a trophy.

The following plants (excluding trophy winners) arranged in order of hours of exposure were operated through 1949 without any disabling

injuries. The first 22 of these plants, those with 20,000 or more man-hours of exposure, were awarded Certificates of Achievement in Safety by the Bureau of Mines.

Dolen wet-pit plant, Texas Construction Material Co., Romayor, Texas; 108,310 man-hours.
 South Side river plant, Dravo Corp., Keystone Division, Pittsburgh, Penn.; 106,889 man-hours.
 Roscoe No. 2 dry-pit plant, Consolidated Rock Products Co., Roscoe, Calif.; 102,651 man-hours.
 Sunland dry-bank and dry-and-wet-pits plant, City Rock Co., Sunland, Calif.; 88,093 man-hours.
 Hudson dry-and-wet-pits plant, Gifford-Hill and Co., Inc., Hearne, Texas; 76,919 man-hours.
 Eddyville wet-pit plant, Concrete Materials Co., Eddyville, Iowa; 70,098 man-hours.
 Milwaukee dry-bank plant, Portland Road and Driveway Co. and T. P. Sand and Gravel Co., Milwaukee, Ore.; 63,217 man-hours.
 Amarillo dry-pit plant, Panhandle Gravel Co., Amarillo, Texas; 50,372 man-hours.
 Boonville No. 1 dry-bank plant, Eastern Rock Products, Inc., Boonville, N. Y.; 42,625 man-hours.
 Stellacoom dry-bank plant, Glacier Sand and Gravel Co., Stellacoom, Wash.; 38,833 man-hours.
 Rockfield No. 124 wet-pit and river plant, Pacific Coast Aggregates, Inc., Friant, Calif.; 37,566 man-hours.
 Kaw No. 2 river plant, Stewart Sand and Material Co., Turner, Kan.; 34,090 man-hours.
 Venango dry-bank plant, Industrial Silica Corp., Utica, Penn.; 32,460 man-hours.
 Claremont No. 11 dry-pit plant, Consolidated Rock Products Co., Claremont, Calif.; 32,008 man-hours.
 Corrigan dry-pit plant, Texas Construction Material Co., Corrigan, Texas; 28,780 man-hours.
 Sierra No. 19 dry-pit plant, Consolidated Rock Products Co., Monrovia, Calif.; 26,902 man-hours.
 Olympia No. 125 dry-bank plant, Pacific Coast Aggregates, Inc., Felton, Calif.; 26,424 man-hours.
 Winona wet-pit and lake plant, Winona Sand and Gravel Co., Winona, Minn.; 24,500 man-hours.
 South Bend dry-bank plant, South Bend Sand and Gravel Corp., South Bend, Ind.; 23,884 man-hours.
 Yardley wet-pit plant, Union Sand and Gravel Co., Spokane, Wash.; 22,740 man-hours.
 Starbrick river plant, General Concrete Products Corp., Starbrick, Penn.; 22,084 man-hours.
 Barneveld No. 2 dry-pit plant, Eastern Rock Products, Inc., Barneveld, N. Y.; 20,502 man-hours.

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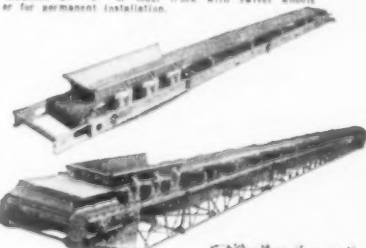
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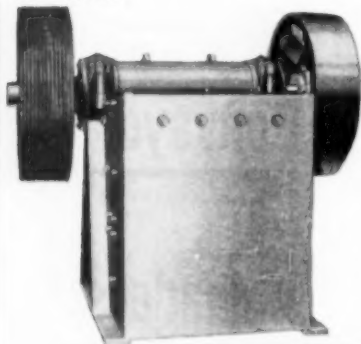
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N.C.S.A. Safety Award Winners

THE HAGERSTOWN QUARRY of North American Cement Corp., Hagerstown, Md., the LeRoy quarry of General Crushed Stone Co., LeRoy, N. Y., and the Cedar Hollow quarry of Warner Co., Devault, Penn., won top safety honors in the twenty-fourth annual National Crushed Stone Association Safety Competition conducted by the Bureau of Mines.

The Hagerstown quarry, for the second successive year, had the best safety record of the competing operations, and was awarded the bronze plaque provided by *Explosives Engineer* magazine. The quarry operated 171,474 man-hours without a lost-time accident. In addition to the two trophy awards in 1948 and 1949, this operation has won Certificates of Honorable Mention for injury-free operations in eight other years of its 20 years' enrollment in the contest.

The LeRoy quarry won second place in the 1949 contest, working a total of 171,297 man-hours without any injuries—a difference of less than 300 man-hours from that worked by the winning operation. Cedar Hollow quarry took third place honors with a safety accomplishment of 143,274 man-hours without any disabling injuries.

The following plants, arranged in order of hours of exposure, also had injury-free records and were awarded Certificates of Honorable Mention.

Bakerton limestone mine, The Standard Lime and Stone Co., Bakerton, W. Va.; 125,980 man-hours.

Jordanville limestone quarry, The General Crushed Stone Co., Jordanville, N. Y.; 76,588 man-hours.

Rock Hill trap rock quarry, The General Crushed Stone Co., Quakertown, Penn.; 74,116 man-hours.

White Haven sandstone quarry, The General Crushed Stone Co., White Haven, Penn.; 73,066 man-hours.

Auburn limestone quarry, The General Crushed Stone Co., Auburn, N. Y.; 67,160 man-hours.

Middlefield No. 1 trap rock quarry, The New Haven Trap Rock Co., Middlefield, Conn.; 55,954 man-hours.

Phillipsburg limestone quarry, The Laura Gravel and Stone Co., Phillipsburg, Ohio; 53,775 man-hours.

Martha limestone quarry, Marquette Cement Manufacturing Co., Martha, Tenn.; 52,454 man-hours.

Holston limestone quarry, American Limestone Co., Mascot, Tenn.; 51,631 man-hours.

Marquette limestone quarry, Marquette Cement Manufacturing Co., Cape Girardeau, Mo.; 49,042 man-hours.

Plant No. 4 trap rock quarry, Southwest Stone Co., Knippa, Texas; 28,901 man-hours.

Ames ag lime and road stone quar-

ry, Ray Cook Construction Co., Ames, Iowa; 28,000 man-hours. Berkeley limestone quarry, North American Cement Corp., Martinsburg, W. Va.; 27,480 man-hours. N. R. Garrett City road and agricultural stone quarry, N. R. Garrett City Quarry Co., Columbia, Mo.; 20,000 man-hours. Ripplemead hydrated lime quarry, Ripplemead Lime Co., Inc., Ripplemead, Va.; 14,560 man-hours. Lamke agricultural lime quarry, Bramel Limestone Quarry Co., Washington, Mo.; 4000 man-hours.

Cement Plant Expansion

MARQUETTE CEMENT MANUFACTURING Co., Chicago, Ill., has announced that production at its Des Moines, Iowa, plant will be increased 50 percent by May 1, 1951, increasing capacity from 1,000,000 bbl. of cement annually to 1,500,000 bbl. D. S. Colburn, vice-president of the company, stated that much of the equipment for the expansion program will be purchased from the China Portland Cement Co. of Shanghai, China. The Shanghai company, due to the political and military upheaval in China, has abandoned an expansion project and is selling its equipment to Marquette Co. Included in the equipment is a 475-ft. kiln.

The company plans to stop generating its own electric power at the plant and will erect a substation to handle power which will be purchased from the Iowa Power and Light Co.

Inventory Controls

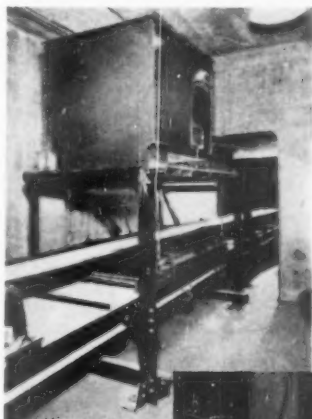
NATIONAL PRODUCTION AUTHORITY, in order to prevent the accumulation of excessive inventories of materials in short supply, has issued under date of September 18, 1950, Regulation 1, limiting the quantities of such materials than can be ordered, received, or delivered. In Section 10.5 it is stated, "No person may receive or accept delivery of material listed in Table I if his inventory of that material is, or by such receipt would become, more than a practicable minimum working inventory." A "practicable minimum working inventory" is defined as "the smallest quantity from which a person can reasonably meet his deliveries or supply his services on the basis of his currently scheduled method and rate of operation."

Materials listed in Table I that would affect the rock product industries include portland cement, gypsum board, sheathing and lath, and steel (carbon and alloy, including stainless).

State Cement Plant

SOUTH DAKOTA is considering the establishment of a second state cement plant at Chamberlain, due to the fact that the present state plant at Rapid City has not been able to keep up with the demand for cement.

Automatic Weighing and Feeding is obtained with MERRICK EQUIPMENT at many National Gypsum Plants



WEIGHTOMETERS*

On belt conveyors provide automatic and continuous weight records of daily production.

FEEDOWEIGHTS*

Accuracy of pre-set kiln feed by Weight is readily obtainable with the FEEDOWEIGHT.



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In Related Industries, the Feedoweight is ideal for blending and proportioning two (2) or more materials

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The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.

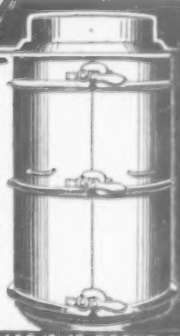
QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—dies for pipe from 12" up to 120" and larger—tough and grove or laid and pipe of lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request.

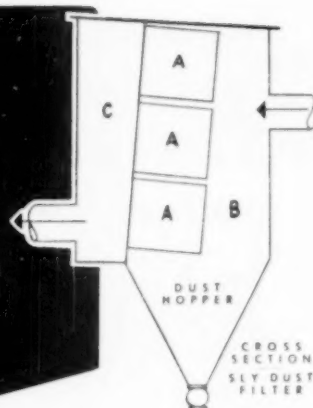
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MEAN...**

1. More cloth area per square foot of floor space.
2. Large precipitation chamber (B). Only the very finest dust reaches the cloth.
3. Ease of inspection and accessibility from (B) and (C).
4. Any bag replaceable without disturbing any other.
5. Taut bags insure uniform and complete vibration of cloth for removal of dust.
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Slurries...handled at lower cost

The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineers. Write for details.



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for Cost-Saving
Performance

**JANUARY
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ANNUAL
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AND
OUTLOOK
ISSUE**

Materials Handling Conference

THE THIRD BIENNIAL Materials Handling Conference, under the auspices of Westinghouse Electric Corp., was held October 24-25, at the Hotel Statler, Buffalo, N. Y. Among the papers presented of interest to the rock products industries were: "A New Development in Materials Handling," by Fred A. Miller, E. I. DuPont de Nemours & Co., Inc.; "Starting Long Conveyors," by A. M. Lemmon, Jeffrey Manufacturing Co., and A. D. Sinden, Stephens-Adamson Manufacturing Co.; "The Importance of Portable Conveyors in Materials Handling," by R. F. Tomlinson, A. R. Farquhar Co.; and "Bulk Cement Handling on Inland Waterway Distribution Systems," by S. C. Marshall, Sauerman Brothers. "British Materials Handling Machinery," a film, was shown through courtesy of Link-Belt Co.

Cement Plant Expands

CALAVERAS CEMENT Co., San Francisco, Calif., recently began a \$600,000 expansion program at its plant in San Andreas, Calif. Included in the program are the installation of additional raw and finish mills and construction of four cement storage silos and four slurry silos. The increased storage facilities will enable the plant to continue operating during the slack winter months, producing large inventories of cement for distribution when demand increases in the spring. The major portion of the project is expected to be completed sometime in December, 1950. Calaveras completed a \$2,500,000 expansion program about a year ago. William W. Mein is president of the company.

Price and Wage Controls

UNDER THE DEFENSE PRODUCTION ACT which authorizes the President of the United States to effect price and wage controls whenever he feels it is necessary in order to stabilize the cost of living, prevailing conditions from May 24 to June 24, 1950, will be considered in the establishment of price ceilings, although another "base period" may be selected if it is considered more "generally representative." However, wages may not be stabilized at less than the rates paid during the period from May 24 to June 24. The President may establish one base period for prices and another for wages.

Business men are required to preserve the records of prices and costs during the above mentioned base period. The President stated that "this means that information will be available to set ceilings at fair levels, and to identify the sellers who have taken advantage of the present emergency."

The Defense Production Act defines wages, salaries and other compensation to include "all forms of remuneration to employees by their em-

ployer for personal services, including, but not limited to, vacation and holiday payments, night shift and other bonuses, incentive payments, year-end bonuses, employer contributions or payments of insurance or welfare benefits, employer contributions to a pension fund or annuity, payment in kind and premium overtime payments."

Installs Perlite Plant

VIRGINIA PERLITE Co., Hopewell, Va., has announced plans for the installation of a perlite ore expanding plant. H. W. Van Ness, president, stated that the company will have an exclusive license arrangement with Great Lakes Carbon Corp., New York, N. Y., large miner of perlite ore. Under this arrangement, the Virginia company will sell its processed perlite under the registered trade name "Permalite."

The new expanding plant is expected to meet the need for perlite within a radius of 150 miles of the plant. Plant capacity will be about 20,000 4-cu. ft. bags per month. Each bag of plaster aggregate will weigh approximately 35 lb., and each bag of concrete aggregate will weigh approximately 50 lb.

Annual Report Winners

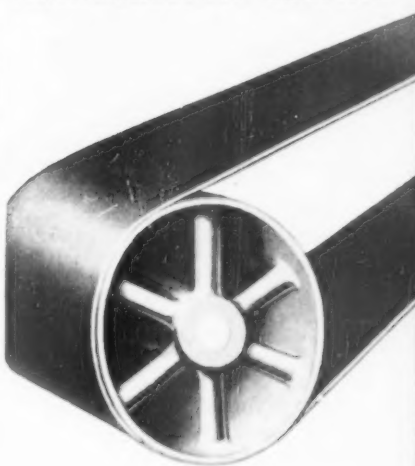
MARQUETTE CEMENT MANUFACTURING Co., Chicago, Ill., for the sixth consecutive year, won top honors in the cement industry for excellence in annual reporting, as announced by the judges in the *Financial World* Annual Report Survey. Permanente Cement Co. and Lone Star Cement Corp. were second and third place winners.

More than 5000 corporate reports were submitted in the 1949 national survey, the tenth in the series. These reports were judged in 100 industrial classifications for "Best of Industry" awards. Weston Smith, executive vice-president of *Financial World* and originator of the surveys, presented the "Oscar of Industry" trophies at the annual awards banquet, held in the Grand Ballroom of the Hotel Statler, New York, N. Y., Oct. 31. W. A. Wecker, president of Marquette Cement Manufacturing Co. The banquet was attended by more than 1200 business and financial leaders from all over the United States and Canada.

Buys Sand and Gravel Business

WAYNE LONG, Burley, Idaho contractor, has purchased Bert Noble's sand and gravel business and will operate it under the name of Noble Sand & Gravel Co. The same crew and manager will be retained under the new ownership.

"POWER KING" Raw Edge TRANSMISSION BELTING



**FOR GREATER STRENGTH,
GRIP AND DURABILITY ON
ALL HEAVY-DUTY DRIVES**

"POWER KING" is custom-built belting with all the extra strength, grip and durability it takes to deliver continuous driving power to your primary and intermediate crushers. Pure rubber skim friction permits greatest flexibility without risk of ply separation. Minimum stretch makes belt run true, reduces strain on pulleys and avoids shut-downs for tightening. Raw edge construction, with edges especially treated to keep out moisture. Widths up to 48 inches.

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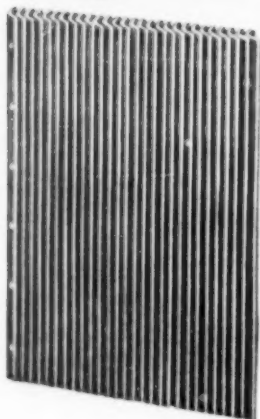
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CAPE ANN ANCHOR & FORGE CO.
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Unit Type CLINKER COOLER GRATE

Saves Assembly Cost



A NEW IDEA IS BORN . . . fathered by a quarter-century of experience in the manufacture of alloy steel castings for cooling equipment.

This improved type of Clinker Cooler Grate is different . . . and definitely better . . . because it comes as a completely assembled unit, ready to drop in place without any expense for assembly work on the job. Its unique design permits a saving in weight, insures increased service life and reduced maintenance. Space for air inlets between bars is controlled by the size of small bosses on back of each bar. Bars are screwed up tight in close contact, and kept in place by two PyraSteel rods, welded at the ends.

Our customers, including nationally known cement companies, have been using these Clinker Cooler Unit Grates with satisfaction and economy.

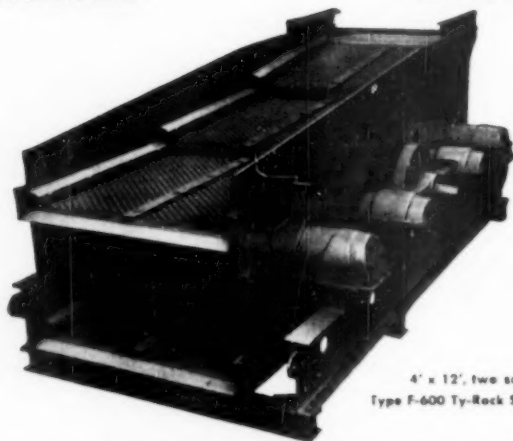
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4' x 12', two surface
Type F-600 Ty-Rock Screen

THE W. S. TYLER COMPANY CLEVELAND 14, OHIO

Manufacturers of Woven Wire Screens and Screening Machinery

MANUFACTURERS NEWS

Straub Mfg. Co., Inc., Oakland, Calif., has announced the appointment of Migula & Co., Pasadena, Calif., as representative for the Southern California area, covering the territory south of Bakersfield.

Ajax Flexible Coupling Co., Inc., Westfield, N. Y., has appointed the following representatives: Samsen Sales Co., San Francisco, Calif., in northern California; Thurlow Equipment Div. of G. Donald Bradley Co., Seattle, Wash., in the states of Washington, Oregon and Idaho; and Boyd Goodhart, Kansas City, Mo., in western Missouri and Kansas.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has announced the retirement of Fred E. Haker as director of purchases after 50 years of service with the company. He will be succeeded in this position by Kenneth R. Geist who has served as assistant to the director of purchases for the past two years. Mr. Haker joined the company in 1900 as a stenographer in the purchasing division. He was named assistant manager of purchases in 1916 and appointed general manager of purchases in 1940. He has been director of purchases since 1946. Mr. Geist, son of the president, started working for the company in 1936 as a summer employee. In 1946, he was transferred to the blower and condenser department where he subsequently became technical engineer-in-charge of the precision casting section. He has been assistant to the director of purchases since 1948.

United States Rubber Co., New York, N. Y., has appointed Henry A. Rome as manager of special products sales, William C. Hall as manager of molded goods sales, and Thomas S. Savoury as manager of flooring sales for the mechanical goods division. They will make their headquarters at the Passaic, N. J., plant.

Schild Bantam Co., Inc., Waverly, Iowa, has announced the appointment of Floyd A. Northrop as assistant advertising and sales promotion manager. Until recently, he was engaged in the advertising and graphic arts field in New York City, where he specialized in the planning and production of industrial advertising and sales literature. He will make his headquarters in Waverly, Iowa.

The Foxboro Co., Foxboro, Mass., has opened a branch office in Wilmington, Del., under the management of Kenneth L. Barton. Another branch office has been opened in Minneapolis, Minn., with Robert C. Cahill as resident engineer.

Barber-Greene Co., Aurora, Ill., announces the appointment of Earl D. Stearns as manager of the conveyor division. He was formerly general sales manager and will be succeeded in

this position by Walter B. Holder, who was sales manager of the construction division. Mr. Stearns, who is nearing retirement age, has requested this move in order to lessen the pressure which surrounded his job as general sales manager and to permit greater flexibility in his own schedule. Ed Holt, manager of Area II at Washington, D. C., has been appointed manager of the Eastern division, and Lowell Larson, manager of Area VI at Minneapolis, will head the Western division. Ralph H. Dano, formerly manager of the Canadian sales area in Toronto, has been named to succeed Mr. Holt in Washington, and Marshall C. Ham, who is presently merchandise sales manager, will replace Mr. Larson in Minneapolis.

Warner Electric Brake & Clutch Co., Beloit, Wis., has announced the appointment of Roger H. Brown, Union, N. J., as Eastern sales manager for the ICB division. He formerly handled engineering sales of the division in the New York area and will be succeeded by R. C. Wiard and W. E. Gregg, who will make their headquarters in Middletown, Conn.

The B. F. Goodrich Co., Akron, Ohio, has announced the retirement of Chester F. Conner, manager of industrial products sales, after more than 40 years of service with the company. Paul W. Van Orden has been named industrial products merchandise manager; Richard G. Cox, manager of original equipment sales; Wilfred A. Smith, manager of molded, extruded, lathe cut and sponge sales; and George J. Fischer, manager of V-belts and packing sales.

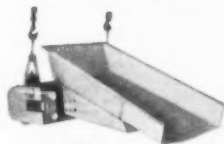
Western Machinery Co., San Francisco, Calif., has announced the opening of a mineral testing laboratory in San Francisco to serve the metallic and nonmetallic mining industries, sand and gravel aggregate industries, etc. A mineral testing department, made up of experienced metallurgical engineers, has been organized to operate the laboratory. Service is to be provided on a cost basis. The laboratory is equipped to investigate mineral engineering problems involving heavy media separation; flotation and gravity concentration; scrubbing; agitation and washing operations; wet classification problems; crushing and grinding characteristics; dewatering and thickening problems; and others.

Petroleum Automotive Products Corp., Detroit, Mich., announces the appointment of O. B. Casey, national service manager, as regional manager for the West Coast, serving the states of Washington, Oregon, California, and Arizona. He will make his headquarters in Sacramento, Calif.

Koppers Co., Inc., Pittsburgh, Penn., has appointed Chester R. Austin as manager of the development section of the research department. He has been a ceramic engineer specialist in the department since 1948. Prior to that he was engaged in ceramic research at the Battelle Memorial Institute.

Flow Solids... ...Like Water **SYNTRON** "Vibra-Flow"

VIBRATORY FEEDERS



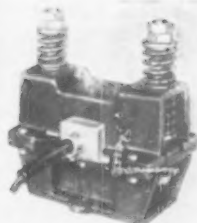
WILL HANDLE — most all types of Bulk materials — from light, fine powders to heavy, coarse lumps — hot or cold — wet or dry.

AT — variable controlled rates from pounds to hundreds of tons per hour.

TO — crushers, driers, ball mills, belt conveyors, etc.



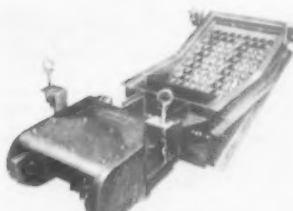
LONG "Vibratory" CONVEYORS
No Motors, Gears or Other
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BIN VIBRATORS
Make Stubborn Materials Flow Freely



VIBRATING GRIZZLIES
Both Feed and Scalp
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VIBRATING SCREENS
Wet or Dry — Single or
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Catalog data is available on request — or write giving the details of your problem — our Engineering Department will be glad to give you their recommendations.

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LONGER PRODUCING LIFE BUILT INTO FARREL-BACON CRUSHERS

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DIGGING GRAVEL with a SAUERMAN SCRAPER

With one man at the controls a Sauerman Power Drag Scraper can reach out hundreds of feet and dig, haul and dump sand, gravel or any bulk material. Simple operation! Economical use of power!

A Sauerman machine can be installed to reach across a pit, pond, river or stockpile, or up to the top of a hill. It moves material rapidly anywhere within its wide radius. Flexible for any ground conditions. Costs only a few cents per cubic yard handled. Gas, electric or diesel.



STORY BEHIND THE PICTURE

When a Sauerman Scraper is installed for making a deep cut and delivering material to a high point, the track cable type of operation often can be used to advantage. The above picture is an example of applying this type of operation in mining a deep deposit of sand and gravel. The scraper bucket is attached to a trolley carrier which rides on a track cable. The bucket returns by gravity from dumping point to digging point, instead of being pulled back by a cable. This reduces the time cycle for a round trip of the bucket—increases the hourly yardage moved.

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Write us about your material handling problems. Our catalog and suggestions on equipment will be mailed to you without obligation on your part.

Forty-One Years of Service to Industry

SAUERMAN BROS., Inc.

530 S. CLINTON ST., CHICAGO 7



St. Regis Paper Co., New York, N. Y., announces the appointment of James W. Taylor as assistant manager of the Southeastern sales district of the Multiwall bag division.

Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J., has appointed John T. M. Frey as assistant manager of the New York branch and Lamar S. Hilton as assistant sales manager of the abrasive wheel department.

American-Marietta Co., Chicago, Ill., has announced the acquisition of The Master Builders Co., Cleveland, Ohio, manufacturer of admixtures for concrete, metallic aggregates for hardening concrete floors and protective coatings for concrete, which will be operated without any change as a subsidiary of American-Marietta. S. W. Flesheim, who founded the company, will continue as president, and Edwin L. McFalls as executive vice-president.

Worthington Pump & Machinery Corp., Harrison, N. J., announces that Harold K. Beck has been appointed commercial vice-president, in addition to his present post as manager of the Washington office. Austin C. Ross, manager of the Buffalo works, has been elected a vice-president but will continue to serve as Buffalo works manager. Louis G. Hilkemeier has been appointed chief engineer of the construction equipment division at Dunellen, N. J.

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Admixtures, Aggregate
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Transmission
Belting, V-Type
Belt Repair Equipment
Bin Level Indicators
Bins and Batching
Equipment
Blasting Supplies
Block Machines
Concrete Building
Bodies, Trailers
Crack Machines and
Molds
Buckets
Buildings
Cais, Industrial

Classifiers
Clutches
Coal Pulverizing
Equipment
Concentrating Tables
Concrete Mixers
Concrete Mixing
Plants
Concrete Specialties
Molds
Concrete Waterproof-
ing and Dampproof-
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Conveyors
Crushers
Cranes
Creeper
Dewatering Equip-
ment, Sand
Diesel Engines
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Draglines
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Drives
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plies
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signing
Explosives & Dynamite
Fans and Blowers
Flotation Equipment
Gasoline Engines
Gear Reducers
Generator Sets
Grinding Media
Gypsum Plant Ma-
chinery
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terials
Hoists
Hoppers
Kilns, Rotary, Shaft,
Vertical

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Mills
Pulverizers
Pumps
Scales
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Screens
Scrubbers, Crushed
Stone, Gravel
Shovels, Power

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Trucks, Mixer Body
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Vibrators
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Winches
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If equipment you are in market for is not listed above, write it in the space below.

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RP-12

The Osgood Co. and The General Excavator Co., Marion, Ohio, have combined its sales management and policies. L. O. McLean, former sales manager of General Excavator, has been appointed director of sales development. James S. Fortner has been appointed sales manager for the combined office, and Kenneth O. Williamson has been named assistant sales manager. George Day, former sales manager of Osgood, has retired after 45 years of service in the power shovel industry, 30 of which were spent with Osgood.

General Electric Co., Schenectady, N. Y., announces that Bascom H. Caldwell, Jr., has been named assistant manager of engineering for the large motor and generator engineering division of the apparatus department. D. E. Brainard, Howard D. Snively, Robert V. Shepherd, and Robert W. Wiseman have been named division engineers.

Caterpillar Tractor Co., Peoria, Ill., has announced the following changes in executive personnel: Harmon S. Eberhard has been named executive vice-president; William Blackie, a vice-president since 1944, will coordinate with Peoria the administration of the Joliet and San Leandro plants and Caterpillar Tractor Co. Ltd., new British subsidiary; E. W. Jackson and Ralph M. Monk have been appointed vice-presidents; W. H. Franklin, controller since 1944, will also assume administrative direction of the accounting and the traffic and order departments; and A. N. Whitlock will assume direct supervision of accounting.

Gramm Trailer Corp., Delphos, Ohio, has announced the election of Dan S. Ellis as executive vice-president. He will make his headquarters at the general offices, which will be moved to the First Lima Bldg., Lima, Ohio, on January 1, 1951. Mr. Ellis was formerly president and director of the Lima-Hamilton Corporation.

Hose Accessories Co., Philadelphia, Penn., announces that Price M. Davis, Jr., Milwaukee, Wis., has been appointed factory representative for Michigan, eastern North Dakota, including Bismarck, and eastern South Dakota, including Pierre. He will also continue to cover Minnesota, Wisconsin, northern Illinois and northern Indiana.

Joy Mfg. Co., Pittsburgh, Penn., announces that Harold A. Montag, assistant to the president, has been appointed a consultant in the defense program of the U. S. Department of the Interior, Washington, D. C., where he will advise defense agencies in connection with equipment and supplies needed for assuring maximum output of mines. Mr. Montag has had 25 years' experience in the mining machinery industry and during World War II was an official of the War Production Board's Mining Division.

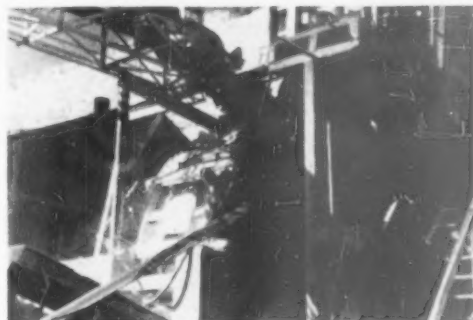
SIXTY FIVE YEARS OF CRUSHER ENGINEERING

NEVADA GYPSUM ROCK

Crushed with a Gruendler
50 in. Impact Crusher

It's
Gruendler
for primary,
for second-
ary crushing

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for positive
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Blue Diamond Corp., Blue Diamond Nevada

Deal with an old established Company for dependability—consistent service.



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CRUSHER & PULVERIZER CO., ST. LOUIS 6, MO.

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CLEVELAND

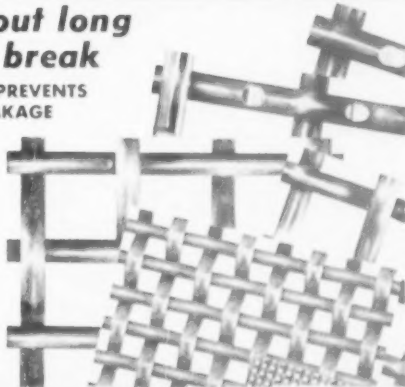
VIBRATING SCREEN SECTIONS

• will wear out long
before they break

NEW SPECIAL STEEL PREVENTS
PREMATURE BREAKAGE

Cleveland Wire has developed a special steel screen with an increased resistance to abrasion guaranteed to give longer service life to your vibrating screen section. It reduces premature breakage of wires because it incorporates an extra tough, hard surface, but ductile enough to carry the abuse of heavy-duty vibrating action. Results are higher output and longer screen life at a lower price to you.

Write for Bulletin No. 1. There is a CLEVELAND WIRE SCREEN for every purpose.



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HAMMOND Multi-Wall BAGS

SEWN • PASTED • OPEN MOUTH • VALVE STYLE

... safeguard your products
against rain, snow, sleet or sun
because they're weather-proof. Special
moisture-proof plies are used for products
requiring extra protection.

Write for quotation on your needs!

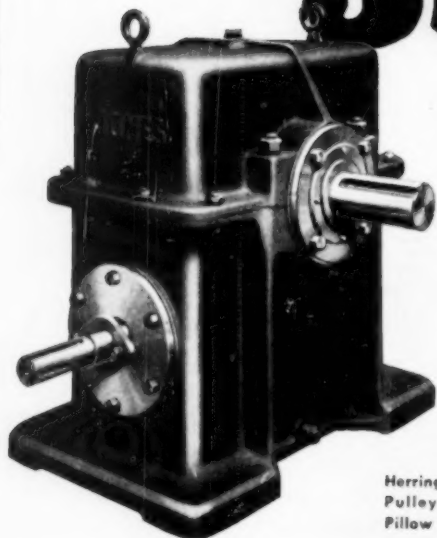


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Plants in Wellsburg, W. Va., and Pine Bluff, Ark.

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WORM GEAR SPEED REDUCERS

A right angle unit built for heavy duty performance in any industry. The worm can be above or below the gear. Shafts are single or double extended for coupling connections or chain or gear drives.

They are built in ratios from 4 to 1 to 90 to 1 and in capacities from $\frac{1}{4}$ to 100 H.P.

Bulletin No. 68 covers selection tables and dimensions.

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For the Service of Industry

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Inverted concrete pipe siphon
at San Antonio, Texas



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HEAD-ROOM TO CONVERT
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- Multiple hydraulically operated gates and streamlined batchers conserve time and space.

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INDUSTRY NEWS

Concrete Institute Publishes 20-Year Industry Index

AMERICAN CONCRETE INSTITUTE, Detroit, Mich., has published the A.C.I. 20-year Index to make more useful the hundreds of papers published since 1929 in the A.C.I. Journal and A.C.I. special publications. The work replaces the 10-Year Index, published in 1947, which indexed and synopsized institute papers and reports published from September, 1937 to June, 1947. The new 20-Year Index records two decades of concrete progress as reported in A.C.I. publications. Promptly on publication this book will go to all institute members. The book will cost \$2.00 to nonmembers of the institute and will cost A.C.I. members \$1.25.

Cover Picture

A SECTION OF AN inverted siphon which runs under the San Antonio River at San Antonio, Texas, is shown in the cover illustration. The 54-in. siphon is 3500 ft. in length and is constructed of reinforced concrete pipe of 12-ft. lengths. Constructed in 1949, the concrete pipe siphon is part of the main outfall sewer of 14,000 ft. of 72-in. dia. reinforced concrete sewer pipe and 2500 ft. of 60-in. dia. sections. The pipe was manufactured by the Thomas Concrete Pipe Co., which has plants at Ada, Lawton, and Oklahoma City, Okla., and Corpus Christi, Texas.

House Plan Books

NATIONAL CONCRETE MASONRY ASSOCIATION recently announced the publication of two new N.C.M.A. house plan books, each of which con-

tains layouts of 20 concrete masonry homes designed by Elmer Gylleck, architect, of Elgin, Ill. Both of these books are essentially the same, except that one stresses the importance of a basement and the other shows alternative plans of the basementless type.

New Ready-Mix Plant

BLOOMINGTON BUILDERS SUPPLY CO., Bloomington, Ill., recently began operations at its new ready-mixed concrete plant. The plant operates four 3-cu. yd. Jaeger HD mixers. Other plant equipment includes a 1000-bbl. capacity silo for cement storage; a 120-cu. yd. aggregate storage bin with a 200-bbl. cement storage tank in the middle; a 3-cu. yd. batcher with separate cement scales and with water batcher alongside; a railroad trestle with storage of 20 cars of materials under it; a 250-ft. belt conveyor which carries the materials to the batching bins; and a push button-controlled mixer.

The officers of the Bloomington Builders Supply Co. are E. M. Whetzel, president, W. J. Whetzel, manager, and Leslie E. Eft, plant superintendent.

A-Bomb Shelters

A-BOMB SHELTER CORP., Teaneck, N. J., has been organized as a subsidiary of Zoro Concrete Co. and will construct private bomb shelters for homes and places of business at prices from \$1500 up. The home model is a 10 ft. square heavy concrete structure and has a metal door. Some suggestions for other uses of the shelter are as a food and general storage space, wine cellar, or a photographic darkroom.

MAYSVILLE READY-MIX CONCRETE Co., Maysville, Ky., has announced that it is now ready for full scale operation. The new plant, centrally located with two railroad spurs to facilitate shipment of supplies, was built by Verville Construction Co. and contains two bucket elevators. The cement elevator handles 50 tons of bulk cement per hour. The Maysville plant has a production capacity of 150 cu. yd. of ready-mixed concrete per 8-hr. day. Clyde Davis, plant manager, stated that the plant will concentrate on small orders, particularly to farmers, but also is equipped to supply dealers. One of its present large contracts is to supply concrete for construction of a floodwall.

DURANT CONCRETE BLOCK CO., Durant, Okla., is now manufacturing Celocrete block at its plant, in addition to pumice and heavy aggregate concrete block. The company also produces septic tanks and sewer drain tile. Roy F. Oakley is owner of the company.

WHETZEL BROTHERS, Champaign, Ill., a paving contracting firm, has been ordered by the Champaign City Council to move its ready-mixed concrete plant from its present location. The action was brought about after the council heard complaints by property owners and their attorney that the plant was a "nuisance."

ODUM LUMBER CO., Birmingham, Ala., has completed its new concrete drain tile plant and is producing 4 x 12-in. concrete tile for septic tanks, farm drainage and drainage around buildings and lots.

READY-MIX CONCRETE INC., Williamson, W. Va., has opened a new plant. The corporation is headed by L. E. Wrenn, president, and Wallace K. Loftis, general manager.

SOUTHSIDE ROCK AND SAND CORP., Mesa, Ariz., has begun production at its new ready-mixed concrete plant. Production capacity is 200 cu. yd. per day.

CROW GRAVEL CO., Mission, Texas, has been granted permission to amend its charter, providing for an increase in capitalization to \$36,000.

E. O. BITNER, De Smet, S. D., has announced plans to erect a concrete block plant.

BROCK CONSTRUCTION Co. has added a concrete batching plant to its Dodge City, Kan. operations. John C. Flemming is the plant superintendent.

ERNE BORGMAN has taken over ownership of a ready-mixed concrete operation in Creston, Iowa.



Independent Concrete Pipe Co., Lockport, Ill., is using this Lorain self-propelled crane in its pipe manufacturing procedure. The crane is used to place heavy steel inside forms in proper position; lift the steel reinforcing sections in place; lift outside steel forms, top collars, and steel lids and pouring bucket; and remove parts of mold forms. It also is used to move finished sections of pipe to the other parts of the yard for storage and to load sections onto trucks for delivering. Here it is placing an outside form around a core and steel reinforcing.

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Announces New Smith-Mobile 6 1/2 Yard Truck Mixer — 8 5/8 Yard Agitator

You'll like this new "King" size Smith-Mobile. It's BIG in capacity and BIG in value... backed by SMITH, the acknowledged leader in the industry for more than 50 years.

The new 6 1/2 yard machine enables you to deliver more yards of concrete per man hour and per truck hour. It is designed to load, mix and discharge, at record speed, even dry or low slump batches. Handles critical concrete to the satisfaction of engineers, contractors and operators, no matter how rigid the specifications. Low weight. Built of the toughest, wear-resistant materials. Conforms to NRMCA standards.

Some of the country's biggest operators have already ordered a large number of these 6 1/2 yard machines for use in New York, Boston, Los Angeles, Chicago and other cities.

Wherever operating conditions make bigger loads possible, this 6 1/2 — 8 5/8 yard job will save you a lot of dollars. Available in both standard models and the now famous LOADLIMIT models. Get the facts. Write for catalog.



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Marble Hill consists of 11 identical 14-story buildings, 1,400,000 sq. ft. floor area. With 11 form sets, each used 14 times, CORBETTA CONSTRUCTION CO., INC. erected up to two stories per working day—165 floors in 123 working days, averaging 1 1/2 floors per working day.

Time saved, four weeks per building, through sound planning and construction know-how, aided by always-dependable performance of 'Incor'* 24-Hour Cement . . . performance which explains why so many leading Ready-Mix operators make 'Incor' concrete available as part of their good service. *Reg. U.S. Pat. Off.

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Structural Engineer: **TUCKER & EIPEL**, New York

General Contractor for Superstructures: **CAULDWELL-WINGATE CO.**, New York

Concrete Construction By: **CORBETTA CONSTRUCTION CO., INC.**, New York

Ready-Mix 'Incor' Concrete: **COLONIAL SAND & STONE CO., INC.**, New York



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**H. A. Van Loon, Bishop,
Calif., uses fluorescent
colors to achieve variety
of architectural effects**

By **WALTER B. LENHART**



The H. A. Van Loon plant is in the background. In foreground are some of the precast tile that are air curing

COLOR GLAMORIZES CONCRETE UNITS

ASK ANYONE IN LOS ANGELES where Bishop, Calif., is located and they will most likely tell you it's a little town up in the High Sierras of Central California and that it is the locale of the best trout fishing in the state. That may be true, but it is also a mining center that supplies the nation with more tungsten than any other section in America.

The fact that the area is a large producer of tungsten means that every school boy, miner, and merchant there knows what "black light," or ultraviolet light can do to some rocks. For tungsten ores under black light literally leap to life and glow in dazzling and beautiful colors.

It is only natural that H. A. Van Loon, a mining engineer, hardware merchant, and concrete products producer, should take advantage of the possibilities offered to design a concrete product which, under ultraviolet light, presents a truly beautiful piece of merchandise. Instead of using expensive tungsten or other ores that have the property of fluorescing, he has developed a series of chemicals and by a selection of these, can make a dull gray pumice block assume colors of bright greens, reds, yellows, whites, gold and pastels. The color in these units, under black light, seems to have depth and appears as though one is seeing a fraction of an inch below the surface of the block. By assembling concrete blocks all made from pumice, and which in many cases are made to resemble natural flagstones, into a fireplace, for example, then by concealing an ultraviolet light at some high point in front of the fireplace and letting the light's beam hit the face of the fireplace, one finds something that is new in concrete products technology.

But specialties of this type are not the only new thing that Mr. Van Loon has developed for the concrete products industry, for he has, in the past four or five years, been developing a machine to make wall and ceiling tile which embodies new ideas and principles.

Source of Pumice

The Bishop, Calif., area has, over the years, been the source of much pumice going into industrial and concrete products uses in southern California. The quality of the Bishop pumice has been such that it can compete in a measure with the materials that are closer to Los Angeles. Bishop is about 285 miles north of that city and on U. S. Highway 395 that connects Los Angeles with Reno, Nev. The highway practically parallels the High Sierras on their eastern edge, and beside trout fishing the area is a mecca for those who like snow-clad peaks and masses of beautiful mountains that can match anything that America has to offer. It is a rapidly growing little city and one will hear more and more of the area in the years to come.

With a growing town as his market, excellent pumice at hand and a host of ideas to put into practice, Mr. Van Loon went into the block business first, using one of the older Flam machines as his production units. After the tile machine was started and improved from day to day, the block business was by-passed completely, and the plant is now working to full capacity making pumice tile on the machine he developed.

In the same city of Bishop, H. O. Black has a relatively small machine shop that is rapidly being converted to a small factory. Mr. Black specializes in manufacturing a special tung-

sten insert drilling bit that is finding use in the tungsten mines. The little shop at Bishop was the place where the tile machine was actually built. Owing to the fact that the machine in Van Loon's plant was so situated that it was practically impossible to get a picture of it, we moved over to Black's machine shop and took the sequence pictures of a later model machine. This unit is being shipped to a concrete products plant in central California.

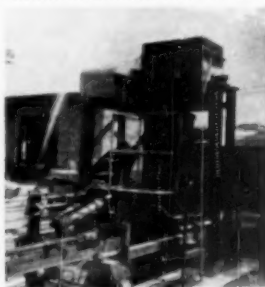
Tile Specifications

First a word about the pumice tile itself: The tiles cast are up to 10 ft. long, 24 in. wide, and 6 in. thick and have four cores that are 4 in. in diameter, plus two half cores. All are parallel to the long axis of the slab. Each unit contains 6 cu. ft. and requires one sack of portland cement. The slabs weigh 450 lb., or 25 lb. per sq. ft. They can be made in modular sizes if desired, but general practice here is to make the units to the specifications of the architects. In all cases the tile are made on a precision basis so they can be placed in walls or ceilings accurately and quickly.

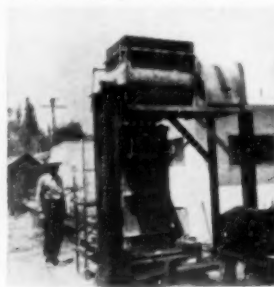
The partly cured slabs are trimmed on one end to exact dimensions with a true and sharp cut by means of a circular saw using a steel-centered carborundum 30-in. dia., circular blade. The blade, with a coarse grit, is supplied by the Carborundum Co. and proved best for this work. The top end is the only end trimmed. In addition, for the wall slabs, two horizontal cuts are made on this same end in such a manner that the cut section can be knocked out later. This makes a slot at the top of the wall so that steel reinforcing rods can be put in place and concrete poured over it to



Operation of the tile machine: cores have been pushed hydraulically into tile mold (horizontal in center).



The mold has been lifted vertically and pumice concrete is being placed from mixer (at top) while mold is vibrated.



The mold has been filled; operator (left) has just released mold and it is beginning to go to the original position.



Mold is flat and cures have been withdrawn. Following this, a plate falls in front of the green tile and tile is pushed out.

insure stability. Water is added to the saw and it takes about 30 sec. to make a cut across the top of a 24-in. section. For slab sections over doorways and windows, the longer pieces of tile can be cut to the proper length. The small pieces of tile that are left from these cuttings are sold locally—even the plant is made from them—and these pieces result in enough income to pay for all cutting. The two saw assemblies each use a 10-hp. General Electric motor, but as the cutting rate depends to a certain degree on the power available, it is intended to use 15-hp. motors in the newer machine. The structural unit meets all building code requirements for California and its important cities.

Tile Machine

The machine used for making the tile consists of a mold box that is pivoted near its lower end in such a fashion that it can be raised and lowered hydraulically. Above the assembly is a small mixer. Near the start of the pouring cycle two flat 12-gauge iron plates are inserted into the mold. These are received in special slots, one at the bottom and one at the top of the mold. The cores are next automatically placed in the mold while it is still in the horizontal position. The mold then is swung via its pivot to a vertical position under the mixer, and while it is being vibrated there the pumice concrete is poured into the mold. After sufficient vibration, the filled mold with the cores returns to the horizontal position and the cores are pulled out of the green concrete. Next, a "push plate" drops into place in front of the steel cores and the cores are returned hydraulically into the mold. This sequence also pushes the green slab out of the mold with the sheet iron top and bottom plates still in place. Thus two of these 12-gauge plates are used per unit cast.

In the plant the green slabs are received on a wide conveyor and are carried horizontally into the curing room. Here the units remain on the conveyor and the operation is such that the entire conveyor can be filled with green tile. The length of this

conveyor governs the capacity of the plant somewhat, for when it is filled the casting has to stop until the units are partly cured. The Bishop plant is considered only a pilot plant, for the curing ramp holds only 19 of the tile units. The slabs are cured under cover under atmospheric conditions overnight, after which they are stripped and trimmed and given additional yard curing.

Vibration is by means of an off-balanced shaft assembly mounted near the bottom of the mold; the amplitude and number of these vibrations per minute have been worked out to give the best structural unit. The machine at Bishop will produce six units per hour with two men, but three men can turn out a high of 12 units per hour. The newer type of machine, it was said, will produce 15 to 20 units per hour and can easily manufacture 100 per 8-hr. shift, which allows for clean-up, starting time and incidentals. After curing, the units are true and a steel straight-edge placed across the face in any direction shows no warping or unevenness. Both faces are smooth. The vertical joint formed by the joining of two slab wall sections can be made to appear as a hair-line, or it can be V-notched by use of different types of molds.

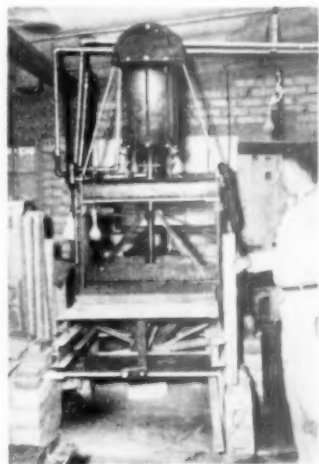
Pumice Tests

The pumice used is all minus $\frac{3}{8}$ -in. with graded sizes. It has about 16 percent minus 200-mesh material in it, and from tests that Mr. Van Loon has been conducting there is considerable evidence that the pumice is an excellent pozzolanic material.

His tests show that the strength curves for pumice concrete do not flatten out like ordinary concrete does at 28 days. Instead, pumice concrete tends to increase in strength gradually with additional time. The following data were supplied by Mr. Van Loon and are the summation of tests he conducted.

Time Period (days)	Strength (lb.)
7	2040
14	2520
21	2450
28	2400
35	2740

To get this wall and roof unit on the market, Mr. Van Loon had to go into the contracting business. He is now a licensed contractor in the state of California. However, once the advantages of the units became evident, others have assumed the erecting phases for the most part. In the town of Bishop alone, which boasts a population of about 5000, some 14 dwellings have been erected using the precast tiles, and within the shipping radius some 70 buildings have been constructed of this slab material. The same slab that is used for wall sections is used for the ceiling slabs with spans confined to 10 ft. or less. Longer spans are made by use of cast-in-place monolithic concrete beams that receive the end section of the precast roof slabs. All roofs are made perfectly flat and leakage is prevented by use of asphaltic treatment or concrete poured over the top section, or both. Mr. Van Loon pointed out that a pitched roof was a hang-over from ancient days when most people lived in houses of reeds and from sheer necessity had to have a steeply pitched



This 5-ton hydraulic press splits flagstone to give them a natural appearance.

roof. The flat roofs having considerable overhang are architecturally pleasing and considerably cheaper to build.

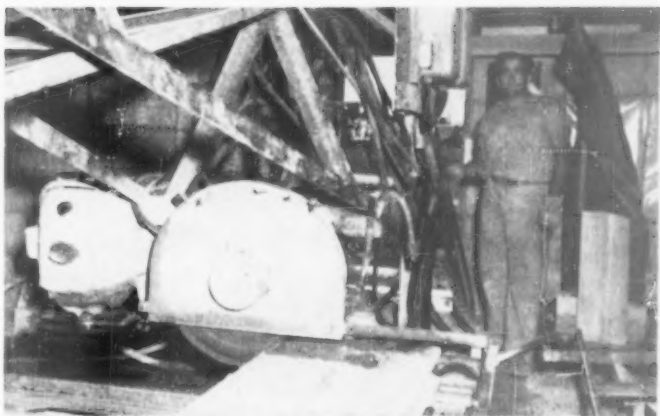
The wall units are erected on the previously prepared foundation in which dowels have been provided and concrete can be poured into that core. The slabs are erected to form the wall and more reinforcing steel can be put through the cores to tie in with the foundation dowel if so desired. The top end has the longitudinal slot sawed in so that reinforcing steel can be placed horizontally along it. The upper end of the core is plugged by a wad of paper so as to leave about 10 to 12 in. of open core. Concrete fills the remaining core space, the sawed slot thus tying the walls together. Lateral load tests and side racking tests have been made by competent testing engineers with excellent results.

For erection purposes a light truck has been equipped with a short boom and several types of tongs are available for handling the members. However, in many cases buildings have been erected by hand lifting, for three men can place these units in the wall or in the ceiling.

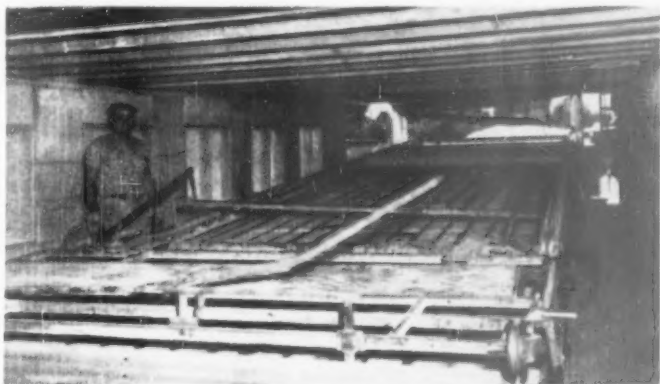
Pumice Building

One type of small building that stems from the pumice concrete wall sections is an 8-x-12-ft. building used by the Interstate Telephone Co. that serves much of the intermountain and desert sections surrounding Bishop. The telephone company required many small buildings in which to house delicate and costly relay equipment. These are scattered over the thinly populated desert and mountain sections. Mr. Van Loon builds for the company a structure that is bullet proof, soundproof, and dustproof. A house, which weighs about 11 tons, is

(Continued on page 180)



Cut-off saw in foreground trims tile ends to exact length; horizontal saw at left cuts a notch in tile end for horizontal reinforcing steel



After leaving the mold, tile are carried flat on a chain conveyor into this curing room, where tile are cured overnight



Some specialty products split into long brick



Method of handling a conventional size wall tile in the yard



Storage yard of Chicago Block Co. Block are cubed neatly, many having steel straps around them. Covered storage is in background



Company testing laboratory contains this 200,000-lb. compression testing machine

PRODUCES AIR-COOLED SLAG BLOCK

Chicago Block Co., Chicago Heights, Ill., processes slag from nearby steel mills at its own plant to make standard, special and catch basin units on single redesigned block machine

THE MAIN PRODUCTION at the Chicago Block Co., affiliate of Anning-Johnson Co., Chicago, Ill., is of lightweight block using slag as aggregate. Heavy block, special products and precast units are made with sand and limestone. The plant is situated near the South Works of Carnegie-Illinois Steel Co., a subsidiary of United States Steel. A disposal contractor delivers approximately 400 cu. yd. of slag per day, obtained from the steel mill. This slag is processed by Chicago Block Co. with about half of the total production going into the plant's own concrete products manufacture and the other half being sold locally to other concrete products producers.

At present, concrete units are produced on a single high-capacity block machine. The block machine was originally built for the production of a concrete roof slab to be used by the parent company. It was found more feasible to produce block on this machine and a different machine is soon to be installed that is capable of producing the specialty roof slab. A pilot machine is now in operation on a small scale.

Block Machine

The specially adapted block machine, a Besser Super Vibrapac, produces four 8-in. equivalent block per pallet per machine cycle. These steel pallets measure 28 x 33 in., weigh 95 lb., and are handled from the returned empty block racks to the pallet cleaning machine two at a time by a two-

high pneumatic offbearer. Block racks are specially built to accommodate the large pallets, and are one pallet wide and six pallets high, allowing 48 block per rack. The block racks, when empty, are spotted at one side of the block machine by a fork truck. At this point pallets are transferred from the rack to a magazine over a chain conveyor with lugs, which takes pallets one at a time from the bottom of the pile.

This chain conveyor carries the pallets through a totally enclosed pallet cleaner with revolving wire brushes. The hood over this pallet cleaner is vented to the outside with an electrically-driven fan providing forced exhaust. After passing through this cleaner, pallets are transferred at right angles to the chain conveyor of the block machine proper. This conveyor has been extended 5 ft. beyond the back of the machine to allow for an automatic oil bath spray. Because of the oversized pallets used, it was necessary for the plant management to design its own pallet cleaner and feeder.

Filled block racks are transferred by a 4000-lb. Moto-Lift fork truck to one of four curing rooms of 90-rack capacity each. This truck transfers racks from the machine to the curing rooms and from curing rooms to the cubing area. After the curing rooms are loaded, steam is introduced for approximately 11 hours, providing for a gradual rise in temperature to about 170 deg. F. After three hours of soaking time, hot dry air is introduced for

one hour, following which the curing rooms are exhausted by a duct and fan system. Hot air from an oil-fired furnace passes through a water spray to generate steam for the curing cycle. A continuous recording thermometer makes a graphic record of curing room temperatures for the entire 24-hr. period.

Block removed from curing rooms are cubed in the machine room with the aid of a pneumatic cuber. Block in these cubes are rearranged or tiered in the usual manner and a band of Signode steel strapping is placed around the next to top course of the cube. Company management estimates increased cost per block, counting both the strapping and labor of application, at 1.66¢ per block, or .50¢ as cost per cube for material. Cubes are removed to yard storage or loaded to outgoing trucks by two Hyster fork trucks equipped with Schmidgall mechanical side-gripper forks.

Coding Cubed Block

Each cube of block has code letters and numbers stencilled on it designating which of the two shifts produced the block, date of manufacture and type of aggregate used. In the storage yard these cubes are placed according to aggregate classification. Though most of the block production is of lightweight block, some heavy-weight units are produced for special orders using sand and limestone. Lightweight slag block will withstand 700 p.s.i. in 14 days and heavy-weight

block attain a crushing strength of 1000 p.s.i. in the same period.

Handling Cement

Air-entraining portland cement is delivered in bulk either by truck or rail. This is collected from the track hopper by a screw conveyor for delivery to a bucket elevator. According to Charles Snyder, plant manager, this system for bulk cement unloading had caused a lot of trouble because the bulk cement tended to plug the screw at the hanger when the screw was running full. By the simple expedient of placing a $\frac{1}{2}$ -pitch screw under the track, which delivered cement to a full-pitch screw section on approach to the first hanger, all plugging was overcome, thus freeing a man who otherwise would have to watch for this condition during screw operation. This system allows for a fully loaded screw conveyor immediately under the tracks, but only a half loaded screw for the remainder of the 30-ft. distance. The screw conveyor is made up of three 10-ft. sections.

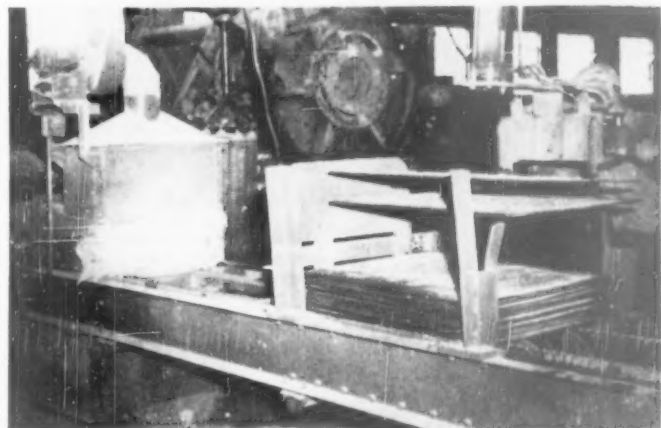
Bulk cement from the overhead bins is transferred to the traveling automatic weigh batcher by a drag-link conveyor; slag is chuted to the batcher through an air-operated gate. Complete electronic controls on the weigh batcher automatically stop flow of materials to the batcher when desired weight limits have been reached. When the weigh batcher is completely charged, a green light appears on the control panel at the mixer operator's station. Transfer of the batcher is controlled by push buttons at this point. Weight limits for different proportioned mixes may be preset on the weigh batcher. The automatic traveling weigh batcher was specially built to Chicago Block Co. specifications by Standley & Co., manufacturer of bins.

In addition to a full line of standard size concrete block and brick, the company also produces a catch basin block that is 5 in. thick and in diameters of 24, 30, 36, 48 and 54 in., on the specially adapted block machine. Wood

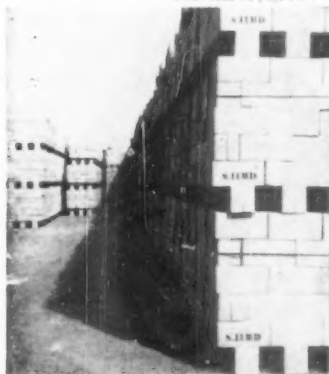
(Continued on page 187)



Block machine recently put in production is used to make catch basin units



Pneumatic offbearer is placing two oversize steel pallets weighing 95 lb. each on pallet cleaning magazine. Hood at left is used to exhaust dust from scraper and steel brush cleaning apparatus



Stored cubed block have stenciled numbers to indicate production information



Charles G. Snyder, manager, standing, and Bill Haglund, shipping clerk



One-cu. yd. yard scoop dumping slag to grizzly over vibrating screen

REGIONAL MEETING OF AMERICAN CONCRETE INSTITUTE

FOLLOWING AN INNOVATION started at Birmingham in 1947 and repeated in Boston in 1949, the American Concrete Institute staged a regional meeting at the Mayflower Hotel in Washington, D. C. as a sequel to the regular fall meeting of the Board of Direction and the Technical Activities Committee.

The opening session was an informal luncheon presided over by the chairman of the local group, E. W. Bauman, managing director of the National Slag Association. General Eugene Reybold, formerly Chief of Engineers, (now executive vice-president of the American Road Builders' Association) briefly addressed the gathering which included the heads of virtually all the government departments and bureaus concerned in any way with cement and concrete. Deans of local engineering colleges were also present.

Technical Sessions

The first technical session Tuesday afternoon, (October 24) was opened by A.C.I. president Frank H. Jackson, principal engineer of tests, Bureau of Public Roads. Byram W. Steele of the Office of Chief of Engineers, Department of the Army, delivered an illustrated address on the design of concrete mixtures for the interior of dams. He directed special attention to the use, as an economy measure, of sand cement in such dams as Arrow-rock about 40 years ago, producing low-heat concrete and a reduction in cement factor only recently approached in the Hungry Horse dam through cement replacement with fly ash. Mr. Steele was followed by Charles W. Allen, research engineer, Ohio State Highway Department, who outlined precautions essential in finishing pavements made of air-entraining concrete.

Harold F. Clemmer, engineer of materials, District of Columbia, discussed the effective sealing of joints in concrete pavements, and Henri Marcus of the Bureau of Yards and Docks, Department of the Navy, presented the results of his basic researches on dowels and other load carrying devices for transverse joints in concrete pavements.

The second technical session (Wednesday forenoon) consisted of an open forum on ready-mixed concrete, presided over by A.C.I. past-president Stanton Walker, well known as the director of engineering for the National Ready Mixed Concrete Association.

The panel of widely recognized "experts" included: Alexander Foster, Jr., vice-president, Warner Co. of Philadelphia; A. A. Levison, vice-president in charge of construction equipment department, Blaw-Knox Co., Pittsburgh; Charles P. Maloney, president, Maloney Concrete Co., Washington, D. C.; Robert F. Porter, vice-president in charge of concrete and building material sales, Harry T. Campbell Sons' Corp., Towson, Md.; J. W. Roberts, vice-president, Southern Materials Co., Inc., Richmond, Va.; and H. F. Thomson, manager, Ready-Mixed Concrete Div., Material Service Corp., Chicago. Mr. Thomson is the current nominee for incoming A.C.I. president as of February, 1951.

Subjects discussed in the open forum included precautions in using calcium chloride, facilities at plants for inspectors, the use of lightweight aggregates for structural and insulating purposes, inspection of truck mixers for wear of blades, and speed of revolving drums for mixing and agitating.

The spirited session on problems of ready-mixed concrete was followed by the showing of a motion picture covering the construction of the Walnut Lane bridge in Philadelphia, the first major prestressed bridge in the United States. It is probable that this pioneering structure will prove to be of epoch making importance.

The third technical session on Wednesday afternoon under the chairmanship of A.C.I. vice-president A. T. Goldbeck, engineering director, National Crushed Stone Association, included four presentations. Fred Burggraf, associate director, Highway Research Board, presented preliminary

data from traffic tests to determine the effects of heavy loads and axle spacing on concrete pavements. The findings thus far confirm the long-time conviction of traffic engineers and analysts that over-loading is a primary cause of physical damage to pavements under traffic.

Construction Methods

William V. Reed, vice-president, Ibec Housing Corp., New York, N. Y., delivered a stimulating and informative illustrated lecture on applications of machine techniques to concrete housing construction. The methods employed appear to be producing excellent results in a venture making multiple use of equipment for houses having flat one-piece precast slab roofs placed by vacuum lift, as well as embodying other elements of novelty.

Another paper bearing on concrete house construction was by Rudolph Valore, Jr., of the National Bureau of Standards. He presented interesting data from tests with "no-fines" air-entraining concrete which displays properties of considerable potential interest from the standpoints of construction and insulating characteristics. Apparently, Mr. Valore was able to secure air entrainment for aggregate sizes much above those heretofore considered effective for incorporating air into a concrete mixture.

Robert A. Gilmore, project engineer, Chesapeake Bay bridge for J. E. Greiner, Co., Baltimore, gave an illustrated discussion of that bridge project which is unique for the great overall length and diversified features of foundation and spans required. Mr. Gilmore's presentation served as a prelude to the inspection trip to the bridge on Thursday by about 60 A.C.I. members and friends.

Each of the three A.C.I. regional meetings has provided evidence that such gatherings meet a need. From start to finish all of the Washington sessions were characterized by good attendance. The total registration was just under 350 persons, many of them from a distance.

With the annual convention scheduled for San Francisco in February, 1951, the institute will have attained a considerable geographical spread during the current operating year. Most of the technical material presented at the Washington meeting will, in due course, appear in the *Journal of the A.C.I.*



F. H. Jackson

Chicago Block

(Continued from page 183)

and steel forms or molds are used in the precast section to make lintels, sills, coping, flagstone, and any architectural specialties.

Slag Production

Slag is delivered to the plant by truck and dumped to ground storage. After a period for drying, slag is recovered from storage by a 1-cu. yd. Scoopmobile and delivered to a 2-cu. yd. hopper over a 4- x 8-ft. Seco vibrating screen. This screen is fitted with 3/8-in. mesh. Oversize on this screen is chuted to a belt for elevation to a hopper over an 18- x 20-in. roll crusher. A Dings magnetic pulley at the head of the belt removes tramp iron. Minus 1/2-in. material discharged from the roll crusher falls to the same belt carrying throughs from the screen. This material is dumped to the boot of a bucket elevator on 60-ft. centers for transfer to the top of the storage silo. Material from the bottom of the silo is chuted to the same bucket elevator boot for elevation to overhead plant bins or to the rail car loading point.

Rejected block are fed to the slag screen from a Good Roads 10- x 20-in. jaw crusher set for 1 1/2-in. discharge. As has been previously mentioned, approximately 50 percent of the slag plant capacity is used for the company's own products production, with the remaining slag sold to other masonry producers in the area.

The entire storage area, totalling 40,000 sq. ft., is paved. Of the area, 3500 sq. ft. is covered. The management uses yard paving as a winter fill-in when the plant is on one shift operation so that there will be sufficient work available to hold key personnel.

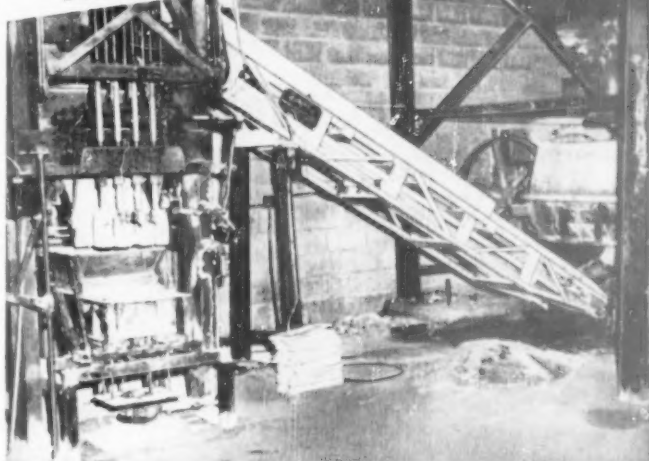
A Watson-Stilman 200,000-lb. hydraulic block testing machine is the main piece of equipment at the company testing laboratory. An electric oven for drying cylinders and block also is available, as well as a 10,000-lb. Dillon Universal testing machine for breaking 2- x 4-in. cylinders.

Western Concrete Pipe Association Convenes

THE FALL MEETING of the Western Concrete Pipe Association was held in San Jose, Calif., on October 6 and 7, 1950. The membership meeting was preceded by a directors' meeting on the evening of October 5, at which the program for the coming year was discussed and agreed upon. Business sessions were held Friday morning and afternoon, October 6 and on Saturday morning. A cocktail party and dinner dance was held Friday evening at the de Anza hotel.

At the Friday morning meeting the following new memberships were reported as obtained since the annual

Farquhar TROUGH CONVEYOR DOUBLES PRODUCTION in CONCRETE BLOCK PLANT



CARRYING a constant heavy load of wet concrete from mixer to block forming machine is a pretty rugged job, but this Farquhar Model 346-2 Trough Conveyor does it day in, day out, without a sign of weakening. And the users are plenty enthusiastic about this performance. "Our Farquhar Conveyor paid for itself in less than two years," they say, "and we have doubled out production as compared with previous hand methods!"

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meeting held last February: Tellyer Pipe Co. of Texas, El Paso, Texas; Hooper Concrete Pipe Co., Phoenix, Ariz.; Gifford-Hill-Western, Inc., Dallas, Texas; Utah-Idaho Concrete Pipe Co., Salt Lake City, Utah; Utah-Idaho Concrete Pipe Co., Nampa, Idaho; The McCormack Co., Hillsboro, Oregon; Spokane Concrete Pipe Co., Spokane, Wash.; Sunnyside Concrete Pipe Co., Sunnyside, Wash.; and Central Valley Concrete Pipe Co., Porterville, Calif.

The Defense Production Act and other legislative matters affecting the industry were discussed at some length. Reports were made on the shortage of cement throughout the country, and it was reported that more cement would probably be available about the first of the year. A more serious condition was reported for reinforcing steel.

On Friday afternoon H. F. Peckworth, managing director, American Concrete Pipe Association, discussed the industry on the national level and reported a steady increase in the use of concrete pipe throughout the country, particularly for sewers. He also discussed at length proposed changes in concrete pipe specifications to be referred to the next meeting of Committee C-13 of the American Society for Testing Materials.

On Saturday morning motion pictures were shown by Mr. Peckworth in illustrating comparative tests made recently on concrete pipe and corrugated metal pipe culverts at St. Anthony Falls, Minn., under the direction of Lorenz G. Straub.

The annual meeting of the association will be held the latter part of March, 1950, in Fresno, Calif.

Ready-Mix Firm Expands

NEW ENTERPRISE STONE AND LIME CO., New Enterprise, Penn., has moved its home office into new quarters in New Enterprise. The company now has sufficient space for the centralization of the various activities in the one building.

The company was organized 26 years ago by J. S. Detweiler and his son, Paul Detweiler. The father was in charge at the quarry and kiln at Waterside, while the son operated the firm's one truck. Today the company operates 75 trucks, including 27 concrete mixer trucks, as well as three Sterling tractors to move heavy road building machinery.

During this 26 years of expansion, the company has bought a number of plants for the production of limestone, lime, sand and other related products. The company has been reorganized several times, the latest being in 1949 when the father, Jerry S. Detweiler, sold his interest to his four sons, Paul I. Detweiler, general manager; Galen Detweiler, director of administration; Dale Detweiler, director of operations, and Emmert Detweiler, director of marketing.



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offers you a choice of 18 shades—6 Reds, 3 Greens, 3 Browns, 3 Yellows, 1 Black, 1 Blue and 1 Orange. Each shade is manufactured to meet the most exacting specifications for cement work as recommended by the American Concrete Institute and the Portland Cement Association.

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"Delta-Mendota Canal near the termination point at Mendota, California. Central Valley Project, U. S. Bureau of Reclamation."



U. S. BUREAU OF RECLAMATION

Here is a picture that speaks volumes...Challenge-Mixed concrete being used on a U. S. Bureau of Reclamation job* in California. Probably no other customer is as particular as the "U. S. Bureau"...slump, proportions of the materials, and uniformity of the mix **must be exact!**

George Thompson, President, Thompson Materials & Construction Company, who are supplying the concrete, said: "U. S. Bureau Engineers have been high in their praise for the Challenge Mixers". It provides the exact slump concrete; the open end permits thorough inspection of the concrete before it is poured, and with the Challenge, it is easier to control the mix.

Don't wait...act now! Get acquainted with this modern, streamlined, truck mixer that pours toughest jobs at lowest cost.

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Glamorizing Concrete

(Continued from page 183)

completely wired before it leaves the plant yard. The foundation is a 12-in. thick slab section with two hollow floor sections. In this base structure are put short stub tie reinforcing iron, and the wall and roof sections put in place. A truck hauls the sturdy little structure to its place of use. The house has only one opening. Some of these units are used to house \$35,000 worth of microwave relay equipment.

Making Flagstone

Still another accomplishment of this pioneering little plant is the manufacture of artificial flagstone. In southern California flagstone is very popular for walkways and yard decorations. Much of this material is a natural stone about 1½ in. thick. It is shipped into the area from Arizona and because of its natural origin there are no color selections possible. A ton of natural flagstone will provide 40 to 45 sq. ft. of usable surface area. At the Bishop plant colored flagstone is made artificially of pumice concrete in a wide selection of colors. These stones are cast in thicknesses of from 1¼ in. up to 12 in. and in a wide variety of shades. The stones are cast flat and in widths of 20 in. with angle iron for the side molds. The colored concrete is poured into the molds, which rest on a suitable table. To get the natural grain various types of paper are used to form the bottom face of the flagstone. No reinforcing is used in the 3500-lb. concrete. The cast sections are about 10 ft. long. The slabs, after air curing are cut to dimension on a special press or splitter that Van Loon has developed and patented. It will cut a slab of pumice concrete up to 36 in. wide and 12 in. thick, both sheared edges resembling natural stone.

Splitting Machine

The machine consists of a specially designed saw-like member, the cutting edges of which have special serrations somewhat resembling a fine-toothed cross-cut saw. This is mounted in a

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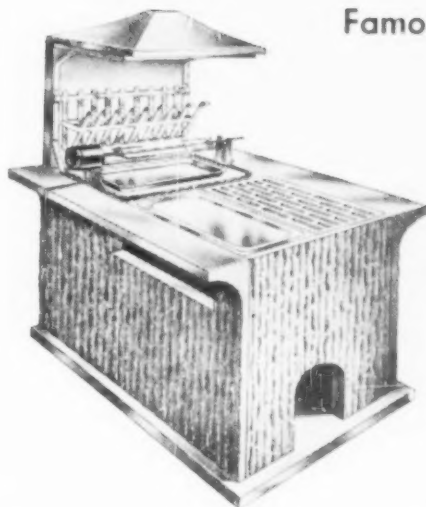
Forest Park, Ill.

press that resembles the conventional large paper cutter. The concrete to be cut is placed under the edge of this cutter and a 5-ton capacity hydraulic cylinder presses the serrated-edged saw vertically and engages the concrete and splits it evenly and cleanly. The cutting edge is 24-gauge steel.

Flagstone made at this plant will cover 130 sq. ft. per ton in the thinner sizes up to 3 in. The concrete will weigh about 100 lb. per cu. ft. so there is a decided shipping advantage in this type of material.

The cast flagstone is then cut into smaller sizes and compares with ordinary brick in a variety of thicknesses. These units are the ones that Van Loon treats with the special chemicals to get the fluorescent effects mentioned earlier. The chemicals he developed are transparent and are not a paint. These chemicals when applied to a colored stone or structural unit do not change the daylight color of the unit. However, under black light the units fluoresce. The light used has a filter in front of the light itself so no beam is noticeable. Removing the filter in front of the light source will, in many instances, cause a change in the color of the fluorescent materials, some of which glow for a second after the light has been turned off. This development of fluorescent concrete is one that can add much beauty to products from a concrete masonry plant.

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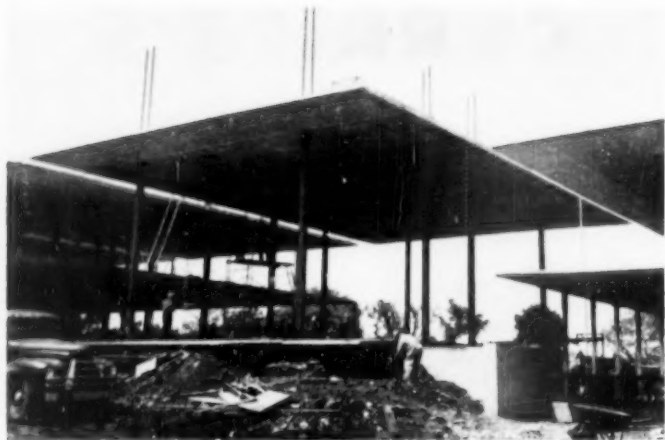
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Building under construction in San Antonio using Youtz-Slick lift slab method

"Raised Slab" Construction

TEXSTAR CORP., San Antonio, Texas, recently sponsored an open forum at the laboratories of the Institute of Inventive Research on Essar Ranch. The subject discussed was the new Youtz-Slick Lift Slab building method, in which the concrete roof and upper floor slabs are poured on the ground and then raised into place by specially designed hydraulic lifting equipment.

This new "raised slab" method was developed by the institute and has been termed "the most revolutionary step forward in the construction industry in half a century."

Texstar Corp. is the first organization franchised by the institute to license construction companies. Its first project was construction of a 52,000-sq. ft., two-story administration building for Trinity University in San Antonio.

Group Insurance Plan

NATIONAL CONCRETE MASONRY ASSOCIATION, Chicago, Ill., has announced the availability of a group insurance plan for N.C.M.A. members. To be eligible for the plan, a member firm must be a regular N.C.M.A. member engaged in the manufacture of precast building units, with the principal place of business in the continental United States, excluding the state of Texas. The firm must also have at least three individuals who are eligible for the insurance including at least two full-time employees other than partners or proprietors.

In order for a member firm to become a participant in the plan, it is necessary that at least 75 percent of the eligible individuals enroll for the contributory employee hospital and surgical expense insurance.

Culvert Pipe Promotion

OHIO AND KENTUCKY MEMBERS of the American Concrete Pipe Association and members of the state highway departments recently saw a movie "Flow of Water in Culverts," by Dr. L. G. Straub. Dr. Straub showed the movie and then answered questions. Similar meetings sponsored by local manufacturers under the auspices of the association may be held in other State Highway Departments and Canadian Provincial Highway Departments, the pipe association reports.

the new **Centered STIRRUPS AND CHAIRS, WIRE FORM HANGERS** for Precast Concrete Joists



- Uniform, Reliable, Trouble-free Stirrups and Chairs for reinforcing and supporting reinforcing bars in Pre-cast concrete joist fabrication.



- All gauge wire form hangers provide a faster method for installing formwork for concrete slabs over precast joists.



- Stock of all standard sizes for prompt delivery anywhere.
- We will make special Stirrups, Chairs or Wire Form Hangers on request.

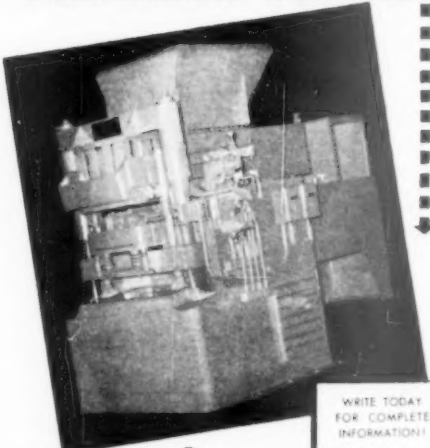
Literature, Prices or Samples on Request



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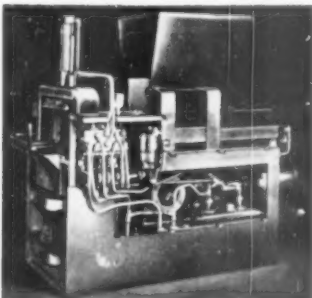
MACHINE WORKS

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NEW MACHINERY

Hydraulic Block Machine

CONCRETE EQUIPMENT Co., Holland, Mich., has introduced a new Hydro-Korpak block machine. This is an automatic unit operated by hydraulic

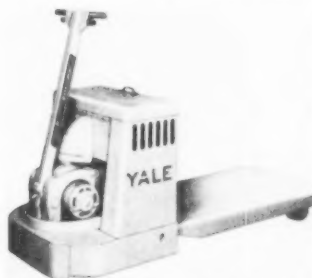


Compact single-mold block machine

pressure. The oil flow is governed by heavy-duty control valves operated by hardened cams. The base of the machine is of welded steel upon which sub-assemblies are attached; it also provides a storage space for the hydraulic reservoir and control mechanism, according to the manufacturer. All motors are 3-phase, 220 or 440 volts a-c.

"Stubby" Lifter Added to Line

THE YALE & TOWNE MANUFACTURING Co., Philadelphia, Penn., has introduced a new "Stubby" Worksaver six in. shorter than previous models of



Short platform lifter hydraulically operated

the same type. The truck is available in 4000 and 6000 lb. capacities. Standard platform lengths range from 36 to 72 in. in six in. increments. Heights of six, seven, nine, ten and eleven in. are available. Platform widths are available in 19, 24, and 26 in. sizes.

Lifting is accomplished by hydraulic mechanism. Twin hoist cylinders are equalized for uniform lifting of loads with conservative oil pressures, the company states. A solenoid operated lowering valve with built in flow regulation gives controlled lowering for cushioning action.



Meeting Load Limitations with high capacity

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The HI-LO and HI-LO Jr. TRUCK MIXERS embody the Revolving Blade Mixing (kneading, folding, blading) — and VISIBLE MIXING ACTION so popular for the past 20 years.

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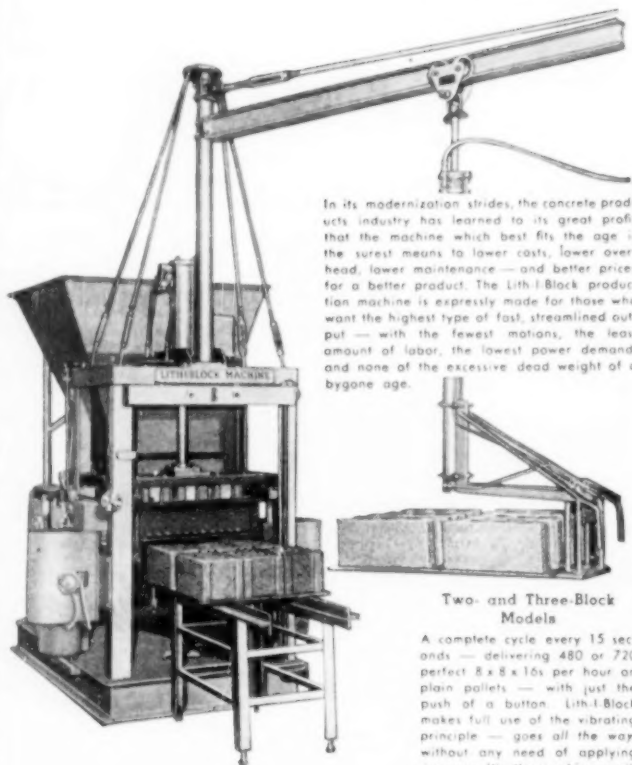


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Lith-I-Block **IN THE
CONCRETE PRODUCTS INDUSTRY
IS THE MACHINE THAT
FITS THE AGE**



In its modernization strides, the concrete products industry has learned to its great profit that the machine which best fits the age is the surest means to lower costs, lower overhead, lower maintenance — and better prices for a better product. The Lith-I-Block production machine is expressly made for those who want the highest type of fast, streamlined output — with the fewest motions, the least amount of labor, the lowest power demand, and none of the excessive dead weight of a bygone age.

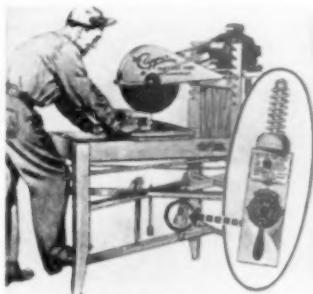
Two- and Three-Block Models

A complete cycle every 15 seconds — delivering 480 or 720 perfect 8 x 8 x 16s per hour on plain pallets — with just the push of a button. Lith-I-Block makes full use of the vibrating principle — goes all the way, without any need of applying pressure. It's the machine you'll eventually come to — so why not now!

Write for descriptive literature and names of nearby users.
LITH-I-BAR COMPANY
HOLLAND, MICHIGAN
Dept. CP 12

Masonry Saw Cutting Aid

CLIPPER MANUFACTURING CO., Kansas City, Mo., has recently completed tests on a new feature added to its



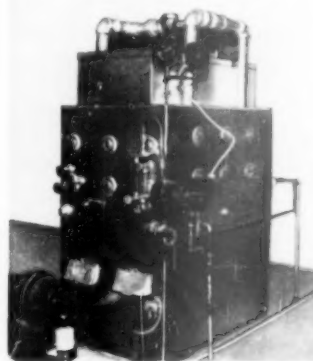
New attachment for masonry saw provides section of cutting pressures

line of masonry saws called the "Save-A-Blade" dial. The company claims this increases blade life and assures faster cutting.

This new device adjusts blade cutting pressure by a single setting of the dial to conform to the hardness or softness of the material. The settings are for brick or tile, concrete products, and glass and marble.

Steam Generator for Products Plants

CONSOLIDATED BOILER CORP., Boston, Mass., has introduced a heat generator for providing steam for the curing of masonry units. This is a low pressure boiler designed to operate as both a



Heat generator for curing concrete masonry units

low and high pressure boiler in furnishing saturated, medium saturated and superheated dry steam, according to the manufacturer.

Method of curing is to start with a highly saturated steam, which allows units initially to absorb the proper amount of moisture. Next, by throwing a switch, the moisture content of the steam is reduced and the tempera-

ture increased. This steam dries the units from the inside out.

The manufacturer states that the heat generator has a patented construction, with vertical flues and special baffles to hold the heat within, giving a recovery of from 85-95 percent. It is also claimed that the unit is completely automatic, requires no licensed engineer, and has cut the cost of fuel by as much as half.

Portable Cement Batcher

SHOVEL SUPPLY Co., Dallas, Texas, has introduced a bulk cement batcher that is easily portable. The unit is

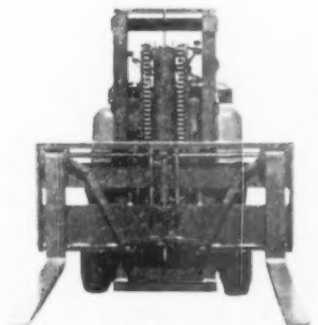


Trucks bring cement to portable batcher on ramp at right; cement is carried to weighing hopper by means of bucket elevator

designated the Ferguson Cement Batcher and has a capacity for up to 12 cu. ft. of cement per batch. Scales and controls are located on the batcher for operation by one man, the manufacturer states. The entire unit is watertight and the bin can be locked. Power is provided by a 16-hp. 4-cylinder engine. Overall height in traveling position is 12 ft. 6 in.

Hydraulically Adjustable Forks

Towmotor Corp., Cleveland, Ohio, has developed an adjustable fork which enables the operator of a lift truck to vary the distance between the two forks quickly and accurately by means of a conveniently located control lever. The fork can be operated while the truck is in motion.



Regulation of distance between two prongs of fork is accomplished by hydraulic power



IN THE BUILDING FIELD *The* CONCRETE MASONRY UNIT THAT BEST *FITS THE TIMES*

After all, the only reason you have a block machine is to be in the business of making blocks that sell. If you want a building block that has more than a cellar future, more than a cheap market — then investigate Lith-I-Block! Lith-I-Block producers do not operate to a limited demand or a restricted market — they have the concrete masonry unit that best fits the times — one that is ideally made with the quality running true all the way thru — the kind of accuracy and uniformity and precision that gets it above the ground into the superstructures where the big volume is to be obtained — and where prestige is made for the Lith-I-Block producer. Why not ride the Lith-I-Block tide — it means more business coming your way! You'll get better quality blocks — and more to each sack of cement! Write for the convincing proof on Lith-I-Block superiority — and get it now while the getting is good.

LITH-I-BAR COMPANY
Dept. CP 12B HOLLAND, MICHIGAN



All Shapes and Sizes to Fit All Purposes
Adaptable to All Aggregates

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Single insertion rate \$10.00 a column inch. Larger insertions at lower rates; request Concrete Products Classified rate card. POSITIONS WANTED (not

display ads) \$1.00 a column inch an insertion. POSITIONS VACANT—\$10.00 a column inch an insertion. Terms: Cash with order except contract advertisers who are billed monthly.

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War Surplus Bargain New — Ready To Use! 40,000 BTU capacity

Burning gasoline, kerosene or diesel fuel.
Electric blower—12 V. DC or 110 V. AC
using small transformer, furnished with
heater.

Portable, Quick, Clean Heat
Ideal for curing room, concrete plants, work
under construction, emergency heat, or auxil-
iary heaters.

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Can be the answer to your light
weight aggregate problem.

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ANDover 3-2664
For information
or write

THE GRANULITE COMPANY

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FOR SALE

Atlas Car Loader with 3 H.P. 220
volt, 3 phase, motorized reducer on
steel wheels. Loaded only 2 car
loads of material. Nice discount

Popp Concrete Products Co.
Neenah, Wisconsin

FOR SALE

(2) Steel Barges—16' x 100'-0", Double
Hull. Condition excellent. Located
Fort Smith, Arkansas. Price—Each

(1) "Sea Mule" Towboat. Steel Hull.
Twin Screw. 2 Chrysler Marine en-
gines recently overhauled. Good
running condition. Price—\$1,000.00
HUGHES & COMPANY
P.O. Box 93 Blytheville, Ark.

UNBREAKABLE PALLET RINGS

Write for full information
TEXAS FOUNDRIES
LUPKIN, TEXAS

FOR SALE

One complete Linkbelt plant No. 9 pro-
ducing 13,000 or more blocks per 8 hour
shift. Includes brick machine, 18 roller
tired racks, over 1,000 pallets, mixer,
and all attachments for different sized
brick. Machine has been used but 18
mos. in excellent condition. Original cost
in 1947 over \$11,000. Will sacrifice at
less than half cost \$4,500 or make me
an offer.

Also one Complete Brikerete Plant.
Purchased new in 1947, excellent condi-
tion, all rubber tired racks, attachments,
mixer, pallets, cost \$8,500. Will sacrifice
for \$3,500.

Write — Phone — Wire

T. B. CLOSTERHOUSE
2344 Burchard St., Grand Rapids, Mich.

TRUCK MIXERS

Priced to Sell

2 Jaeger 1948 2 Yd. Hi-Dumps
Mounted on 1948 GMC Model
153.

Excellent Condition

AMERICAN CONCRETE SERVICE

P.O. Box 414, Hamilton, Ohio
Phone 3-3511

FOR SALE

Baker English Bowl a concrete fix-
stock feeder. Nationally known and ac-
cepted for 10 years. All equipment in
climbing mode, no failures, rights to fran-
chise same. Write only to

J. C. BOYER COMPANY
1137 Shelby St. Shelbyville, Ind.

NOTICE TO OWNERS OF No. 9 JOLTCRETES

We have a large stock of repair parts,
boxes and pallets at prices less than new
parts. Write for list.

EQUIPMENT SERVICE COMPANY

Roanoke 4, Virginia
Phone Mr. Comer 8872 or write
P.O. Box 838

FOR SALE AT A BARGAIN

Have a new Ross Tumbler mill, made from
all stainless steel, 18" dia. 48" high. At-
tachment for making 4" and 6" blocks. Also 1,000 concrete
pallets in bulk stock. 20 18" dia. 48" high
tired rollers. Each roller for making 3 different
sizes of brick and blocks.

E. A. ROBERTS
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FOR SALE

Crushed and sized cinder aggregate, test-
ed and approved for the manufacture of
cinder blocks. Write:

DULUTH CINDER, SLAG & STONE CO.
Box 116 Duluth 7, Minn.

FOR SALE

Combination Block Plant. Small
ready mix plant with one truck, bins,
elevators, car unloader, septic tank
set-up complete with service truck.
Joist machine, tile machine and hy-
draulic block machine, with a capac-
ity of 3,000 blocks per day. Concrete
Block Building, with concrete run-
ways. A paying business, but must
sell due to other business interest.
Plant located on southeastern coast.
Box 112, Concrete Products, 309
W. Jackson Blvd., Chicago 6, Ill.

FOR SALE

Established fast growing specialty con-
crete business in one of the fastest grow-
ing towns in Florida. Room for unlimited
expansion. Wonderful opportunity, owner
must sell on account of health. Address:
Box 115, CONCRETE PRODUCTS, 309
W. Jackson Blvd., Chicago 6, Ill.

FOR SALE

Keller A-30 Mixer, has had competitive
little use. Need new blades. Sell for
\$975.00.

2,500 pressed steel pallets to make 8"
full width block, 35¢ each.

J. J. YELLEN

381 Jefferies St. Perth Amboy, N. J.

FOR SALE

10 20' and 30' concrete batch mixers with con-
crete and rubber. Excellent condition, good steel
\$500 to \$1,000 each. See them high at Imperial and

IMPERIAL READY MIX CONCRETE COMPANY
1400 W. Lake Street, Morris Park, Illinois

JOIN

12,858

PRODUCERS

WHO

REGULARLY

READ

ROCK

PRODUCTS

STOP that WATER

With FORMULA NO. 640

A clear liquid—2 different resins in a solvent which penetrates 1" or more into concrete, masonry blocks, stone, seals, holds (250 psi water pressure). Applies quickly—no mixing—no tarring—no mud—branes—no cleanup. Use on terraces—good or concrete.

HAYNES PRODUCTS CO., OMAHA 3, NEBR.

FOR SALE

Stearns Clipper stripper. Used 6 months. Located N. W. Iowa. Box J-21 CONCRETE PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

CONCRETE BRICK COLORS CEMENT COLORS MORTAR COLORS

made by

BLUE RIDGE TALC CO., INC.
Henry, Virginia

COMPLETE MODERN BLOCK PLANT, LAND BUILDING FULLY EQUIPPED 2 KIRPAK BLOCK AND CHIMNEY MACHINES, 400-4" 8"-12" STEEL PALLET, LIFT TRUCKS, STEEL RACKS, ALL TYPES MOLDS 2-2 TON TRUCKS, FLAT DUMP, UNLIMITED CINDER SUPPLY, 2000 YDS. ON HAND IN OPERATION. REASONABLE.

WHITE
WHARTON CEMENT PRODUCTS CO.
E. CENTRAL AVE. WHARTON, N. J.

FOR SALE

SILO EQUIPMENT

New Monarch Hydraulic Stave Machine. Door frame machine and pallets. Run only four days.

MACLAY CONCRETE CO.
Festus, Missouri

PACKER-HEAD WINGS

Both McCracken Type and Martin Trowlers—PROVED to last as long or longer — yet cost considerably less. Write for prices.

TEXAS FOUNDRIES
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30,000 pressed steel pallets in stock. All sizes. Send tracing of your pallet for quotation.

General Engines Co., Inc.
307 Munter Street
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FOR SALE—15-2 H.P. 3 Phase Westinghouse Motors, new, in original crates, 1800 RPM 60 Cycle 220/440 Volt, open ball bearing type. With manual starters. \$42.50 each F. O. B. Des Moines.

J. R. Lowry, 6701 Douglas Avenue,
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A car load or a train load. Our supply is unlimited. Processed ready to use. Locations on Baltimore & Ohio, Pennsylvania, Lehigh Valley, and Reading Railroad. Call or write.

ROY P. McMINDES COMPANY
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Phone: Essex 179

CEMENT COLORS

Write for free samples and prices of "LANSCO" CEMENT COLORS produced in 34 attractive shades. Packed in bulk and in 1 lb. and 5 lb. packages.

manufactured by

LANDERS-SEGAL COLOR CO.
73 Delavan St. Brooklyn 31, N. Y.

WANTED BRICK MACHINE BLOCK MACHINE

Dunbrik or other make brick machine. Lith-I-Bar or similar type block machine using plain pallets. Send information and lowest price. Will arrange to inspect.

Write, William F. Cole, 3557
Shelmire St., Phila. 36, Pa.

WANTED

Want block Machine that makes smooth hard pressed top block. Will rent or lease with option to buy. Responsible party. Price must be right.

Write J-16, care CONCRETE PRODUCTS
309 W. Jackson Blvd., Chicago 6, Ill.

WANTED TO BUY

Want to buy block or precast plant with switch facilities, in the Chicago area, within 100 miles. Write Box J-19, CONCRETE PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

FOR RENT

2-1950 Jagger two yard mixers mounted on new 17 Ford Trucks available for Dec. Jan. Feb. and March. Will lease for all or part of this period on reasonable terms. Driver and maintenance furnished.

PALO ALTO CONCRETE CO.
Emmetsburg, Iowa

FREE SERVICE for BUYERS

Here is the quick way to get information and prices on machinery and equipment. Just check the item (or items) listed below about which you desire information. Then send this list to us, and we will take care of the rest.



TEAR OFF HERE

Administrators, Aggregate
Aftercoolers, Air
Aggregates, Special
Air Compressors
Air Separators
Asphalt Mixing Plants
Bagging Machines
Bags
Barges
Batchers
Belting, Conveyors
Elevators, Power
Transmissions
Belting, V-Type
Belt Repair Equipment
Bin Level Indicators
Bins and Batching
Equipment
Blasting Supplies
Block Machines
Concrete Building
Bodies, Trailer
Brick Machines and
Molds
Buckets
Buildings
Cars, Industrial

Classifiers
Clutches
Coal Pulverizing
Equipment
Concentrating Tables
Concrete Mixers
Concrete Mixing
Plants
Concrete Specialties
Molds
Concrete Waterproofing
and Dampproofing
Conveyors
Crushers
Coolers
Cranes
Derrick
Dewatering Equipment, Sand
Drum Engines
Dragline Caddies
Excavators
Draglines
Drilling Pumps
Drilling Accessories
Drills

Drivers
Dust Collecting
Equipment & Supplies
Electric Motors
Engineering Service
Consulting and Designing
Explosives & Dynamite
Fans and Blowers
Flotation Equipment
Gasoline Engines
Gear Reducers
Generator Sets
Grinding Media
Gypsum Plant Machinery
Hard Surfacing Materials
Hoppers
Kilns, Rotars, Shaft
Vertical

Locomotives
Lubricants
Mills
Pulverizers
Pumps
Scales
Screen Cloth
Screens
Scrappers, Crushed
Stone, Gravel
Shovels, Power

Speed Reducers
Tanks, Storage
Tractors
Trucks, Industrial
Trucks, Mixer Bods
Trucks, Motor
Vibrators
Welding & Cutting
Equipment
Winches
Wire Ropes

If equipment you are in market for is not listed above, write it in the space below.

Send to:

Research Service Department

ROCK PRODUCTS

309 W. Jackson Blvd.

Chicago 6, Illinois

Your Name

Title

Firm Name

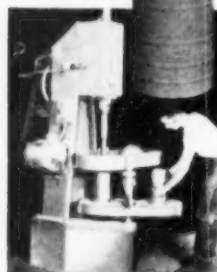
Street

City

State

BIG PROFIT Manufacturing Cement Drain Tile

CHAMPION
Drain Tile
MACHINE



Farm drainage—home building—reclamation projects—highway construction. From these and other sources comes the biggest demand for drain tile in history. More local plants are urgently needed.

It's a wide-open opportunity. Either as an independent, full-time business or as a profitable addition to other concrete products.

World's Finest Tile

Champion-made drain tile are dense, strong, truly round and always uniform. No distortion, no shaling. Far superior to clay tile—worth more but can be sold for less. And still leave a handsome profit margin.

The Champion makes manufacturing easy. Pares costs. Requires no high-priced labor. Makes all sizes up to 12-inch. Yet calls for only a moderate investment.

Get the Facts

Write for new Drain Tile Book. Tells about the possibilities in the drain tile business—costs of materials—selling process—etc. Also completely describes the new Champion machine.

CONCRETE EQUIPMENT CO.

532 Ottawa Avenue
HOLLAND, MICHIGAN



CONCRETE BURIAL VAULTS

AMERICA'S FINEST MOLDS AND LOWERING DEVICES

TERRITORY FRANCHISES

BERG VAULT CO.

EQUIPMENT DIVISION
1620 LUCAS HUNT RD. ST. LOUIS 20, MO.

Available Soon

THE MULTICO "LITTLE BEAVER"

New High Speed Low Cost
Concrete Block Machine

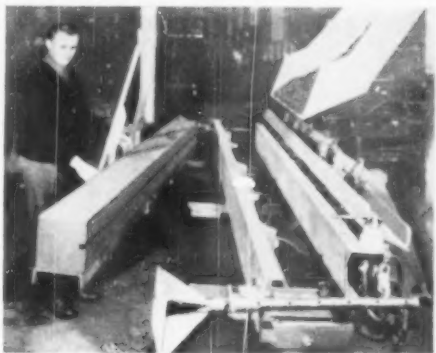
THE MULTIPLEX MACHINERY
CORP.
ELMORE, OHIO

INDEX TO ADVERTISERS IN THE CONCRETE PRODUCTS SECTION OF ROCK PRODUCTS

ALSO SEE INDEX OF ROCK PRODUCTS SECTION
ADVERTISERS ON PAGES 210, 211

Allied Chemical & Dye Corp.	188
American Concrete Service	196
Automatic Spring Coiling Co.	192
Baughman Mfg. Co., Inc.	193
Berg Vault Co.	198
Blue Ridge Talc Co., Inc.	197
Boyer, J. C., Co.	196
Celotex Corp.	188
Chain Belt Co.	176, 177
Clapp, Riley and Hall Co.	196
Closterhouse, T. B.	196
Cole, William F.	197
Columbia Machine Works	192
Concrete Equipment Co.	198
Concrete Transport Mixer Co.	193
Cook Bros. Equipment Co.	190
Currier's Enterprises	191
Duluth Cinder, Slag & Stone Co.	196
Equipment Service Company	196
Farquhar, A. B., Co.	
Conveyor Division	187
General Engines Co., Inc.	197
Gerlinger Carrier Co.	199
Granulite Company	196
Haynes Products Co.	197
Hughes & Company	196
Imperial Ready Mix Concrete Co.	196
Jackson & Church Co.	200
Kent Machine Co.	199
Landers-Segal Co., Co.	197
Lith-I-Bar Co.	194, 195
Lone Star Cement Corp.	180
Lowry, J. R.	197
Maclay Concrete Co.	197
McMindes, Roy P., Co.	197
Multiplex Machinery Corp.	198
National Concrete Masonry Association	178
New Haven Vibrator Co.	189
Oswalt Engineering Service Corp.	180
Palo Alto Concrete Co.	197
Pennsylvania-Dixie Cement Corp.	191
Popp Concrete Products Co.	196
Roberts, C. A.	196
Smith, T. L., Co.	179
Solvay Sales Division	188
Supremix, Inc.	174
Texas Foundries	196, 197
Wharton Cement Products Co.	197
Williams, C. K., & Co.	189
Yellen, J. J.	196

Steel Short? — SELL CONCRETE LINTELS!



SUPER LINTELATORS

Make lintels 7 1/2" HIGH by 3 1/2" 5 1/2" 7 1/2" 9 1/2" 11 1/2" WIDE in these lengths.

5 6	2 8" up to 6'
5 7	2 8" up to 7 4'
5 8	2 8" up to 8 8'
5 9	2 8" up to 9 4'
5 10	2 8" up to 10 8'

STANDARD LINTELATORS

Make lintels 7 1/2" HIGH by 3 1/2" 5 1/2" 7 1/2" WIDE in these lengths.

No. 6	2 8" up to 6'
No. 7	2 8" up to 7 4'
No. 8	2 8" up to 8 8'
No. 9	2 8" up to 9 4'
No. 10	2 8" up to 10 8'

The **KENT MACHINE CO.**
CUYAHOGA FALLS, OHIO

Expand Your Markets Profitably with the

KENT Lintelator

Concrete lintels are being more and more widely accepted by builders who formerly would use only steel lintels. That's natural for there are many arguments in favor of the concrete type as made on the KENT LINTELATOR.

Now, with steel becoming more and more difficult to obtain, manufacturers will be able to sell tough buyers who wouldn't listen to them before — to greatly expand their sales of this stable item and considerably increase their total profits.

What are you doing about the LINTELATOR and the lintel market? If you haven't looked into the matter isn't it wisdom to do so without further delay? Write at once for the new bulletin.

CONCRETE PRODUCTS MACHINERY SINCE 1925

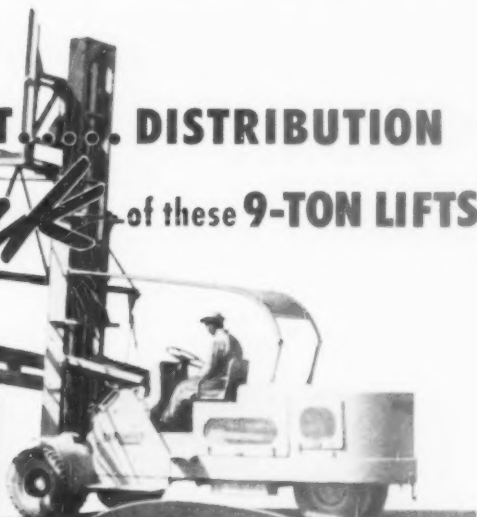
GERLINGER'S COUNTER-ACTIVE WEIGHT..... DISTRIBUTION Makes *Easy Work* of these 9-TON LIFTS

Seattle Concrete Pipe Co. is manufacturing pre-cast concrete beams that weigh ten tons and are forty feet long. Moving these cumbersome units about the plant proved an easy job for their 9-ton Gerlinger Lift Truck.

Talbott Campbell, president, says: "Our Gerlinger Lift Truck does a very good job for us in the efficient handling of materials in our yard. We have had a very low upkeep expense on this lift truck during the time we have owned it."

The balanced weight distribution of a Gerlinger Lift Truck makes it particularly ideal for such off-size lifts. 54% of the truck's weight is where it's needed —

— over the front wheels — for maximum traction and easy maneuverability. This is just one of the many exclusive job-proven features that enable Gerlinger Lift Trucks to out-perform all others in the most rugged handling jobs.



GERLINGER CARRIER CO. DALLAS, OREGON

AT LAST!

chem brick

A FACE BRICK
OF HIGHEST QUALITY—

MADE WITH THE CHEAPEST
MATERIALS KNOWN TO DATE

"CHEM BRICK" re-
quires no cement or
commercial lime . . .
is made only with
sand and waste ma-
terials.



Detroit Brick & Block Company, first licensee by
Jackson & Church Company to manufacture
"CHEM BRICK"

"CHEM BRICK" . . .

the sensational, new building ma-
terial . . . passes the A.S.T.M. specifi-
cations for first quality face brick and
the most exacting freezing and thaw-
ing tests . . . yet no ingredient costs
more than \$2 per ton, including binder.

A REAL HIGH QUALITY FACE BRICK WHICH CAN BE MADE CHEAPER THAN ANY COMMON BRICK ON THE MARKET TODAY

This quality product . . . made by the cheapest process in the brick
industry is finding a ready market in the Detroit area where it has
brought usually expensive brick veneering within the reach of average
purses. In addition to its low cost other features are its distinctive fin-
ish, color and uniformity which give any building that "quality appear-
ance" when used as a facing material.

Besides being a fine face brick . . . "CHEM BRICK" is an all-purpose
brick because of its low cost of manufacturing. Can be used anywhere
brick is used . . . facing, back-ups, partitions, manholes, fire places,
chimneys, basement walls, etc.

Boxed at left are excerpts from test reports on "CHEM BRICK" made
by Pittsburgh Testing Laboratory. Note distinctive appearance of home
pictured utilizing "CHEM BRICK" as facing material.

PITTSBURGH TESTING LABORATORY
PITTSBURGH, PA.
REPORT
TESTS OF "CHEM BRICK"
MADE BY DETROIT BRICK & BLOCK CO.
DETROIT, MICH. & BROS. CO.
DATE: 12/1/34

COMPOSITION
1/2 brick - 1/2 brick (1/2 brick)
No. of samples: 100, 100, 100, 100
Storage: 4000

RESULTS OF TESTS
No. of samples: 100, 100, 100, 100
Storage: 4000

ANALYSIS
1/2 brick (1/2 brick) - 1/2 brick
No. of samples: 100, 100, 100, 100
Storage: 4000

ALL ANALYSES SUBMITTED BY DETROIT BRICK & BLOCK CO.
PITTSBURGH TESTING LABORATORY
MANAGER: DETROIT DISTRICT

REPORT - PITTSBURGH TESTING LAB.

METHOD OF TEST - S.T.P.M. (Standard Test Method)
covering Standard Methods of
Testing & Measuring Brick for
a basis of 10,000 lbs.

CONCLUSIONS - Test indicated compliance with Agency
Union requirements for freezing and thawing tests.

RECOMMENDATIONS -
PITTSBURGH TESTING LABORATORY
Frank G. Galt
TESTER & INSPECTOR DETROIT

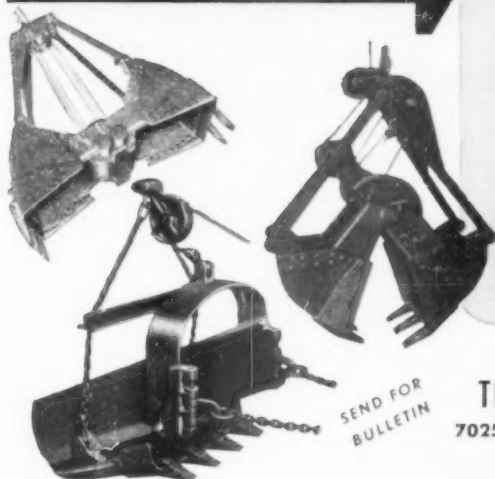


Typical new home construction using "CHEM BRICK" as face brick.
Detroit, Michigan.

JACKSON & CHURCH COMPANY
SAGINAW, MICHIGAN
"WORK WELL DONE SINCE '87"

**GREATER YARDAGE!
LOWER COST!**

WELLMAN Williams WELDED BUCKETS



Wellman Buckets cost less to maintain because they are ruggedly built. They deliver bigger payloads because they are properly designed. The superior engineering in Wellman Buckets gives the operator better balance, easier handling, cleaner digging. Wellman pioneered the unique construction that pays off in greater yardage at lower costs. There's a Wellman Bucket for every service.

SEND FOR
BULLETIN

THE WELLMAN ENGINEERING COMPANY

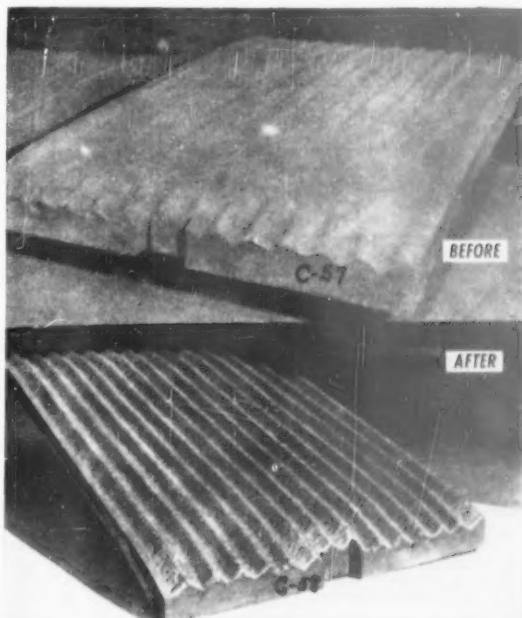
7025 CENTRAL AVENUE

CLEVELAND 4, OHIO

Rebuild Your Crusher Plates with two-tone Mangatone N. M.

Does it make sense to throw away 90% of a manganese plate, just because the rock-producing corrugations are gone? It isn't necessary any more—in fact, it is sheer waste. Your crusher plates can be rebuilt economically with TWO-TONE MANGATONE N.M. in any regular Two-Tone Shop. THEY WILL LAST LONGER THAN NEW PLATES. They will fit your crusher "like a die." Every plate guaranteed.

This is an actual unretouched photograph. See how perfectly the plate has been rebuilt. Call in our field man and let us rebuild one for you.



RESISTO-LOY CO., Manufacturers . . . Grand Rapids 7, Michigan

SCREENING COSTS

with
the

—WAY
—DOWN

CA concentric
action

LINK-BELT VIBRATING SCREEN

Production men throughout the industry are using the remarkable "CA" screen with circular vibrating motion for accurate medium and heavy duty sizing jobs as well as for scalping, dewatering or rinsing operations. New production records are being set daily through increased amplitude at high speeds; cushion smoothness in starting and stopping; clear screening surface and many other features. Why not investigate today?

LINK-BELT COMPANY

Chicago 9, Indianapolis 4, Philadelphia 40,
Atlanta, Houston 1, Minneapolis 5, San Fran-
cisco 24, Los Angeles 33, Seattle 4, Toronto 8,
Johannesburg. Offices in Principal Cities.

ASK FOR
BOOK
NO. 2154

BIN-LEVEL CONTROLS

2 BIN-DICATORS
Often Replace 1 Man



BIN-FLO

Aerating Units Keep
Finely-Ground
Materials
Moving

ECONOMICAL
MATERIAL
CONTROL

DEPENDABLE
BIN-LEVEL
INDICATION

Mail
This
Coupon

THE BIN-DICATOR CO., 13946 Kercheval, Detroit 15, Mich.

Please send new 20-page catalog giving complete information and specifications on BIN-DICATORS. Also please send information on BIN-FLO Aerating Units.

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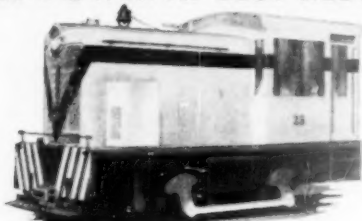
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BP 17

FITTED POWER for BEST RESULTS



This 1949, 25-Ton, 0-4-0 Davenport brought to a total of seven the Davenport Locomotives serving the Granite City Steel Co., Granite City, Illinois.

to Owners of H. K. PORTER LOCOMOTIVES

We have purchased the locomotive business of H. K. Porter Company, Inc. of Pittsburgh, Pa., and wish to assure all owners of H. K. Porter Locomotives that we are prepared to extend friendly and helpful service on repair parts — or duplicate locomotives to H. K. Porter design.

Every rail operation is different! Length and frequency of trips; grades, curves, condition of rails; condition and kind of cars; size of loads — all these are pertinent and can lead to but one conclusion: For best results, your haulage power unit should be **FITTED** to your particular haulage operation.

Our engineers will be glad to receive a description of **YOUR** haulage conditions and submit reliable, money saving recommendations. No obligation.

Write Us Today

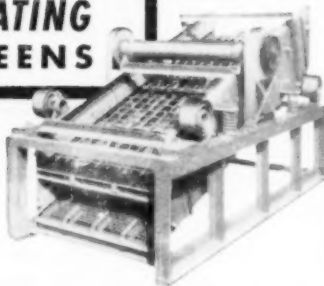
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DAVENPORT LOCOMOTIVE WORKS
A DIVISION OF DAVENPORT BESSLER CORP.
DAVENPORT, IOWA, U. S. A.

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FOR
LIGHT, MEDIUM and HEAVY DUTY SCREENING
WET or DRY

The Double-Deck Heavy Duty 4' x 10' OVERSTROM Vibrating Screen illustrated is one of many types and sizes available for screening of crushed rock products, sand and gravel, limestone, cement, gypsum, borax, mining ores, salt, coal, coke, etc.

Screening machinery, engineered by pioneers and accepted by industry throughout the world for the past 25 years, is available for various applications, in any type or size, single, double or triple deck models, open type or dust-housed complete with hoppers and chutes fabricated to specifications.

Write to Screening Machinery Division for Bulletin S-4.

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Screening Machinery - Concentrating Tables

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LINK-BELT Malleable Iron and Promal Cast Elevator Buckets

Accurate, uniform dimensions consistently maintained.

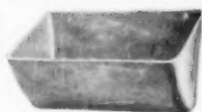
Smooth, seamless surfaces minimize friction and wear.

Reinforced corners for greater strength where needed.

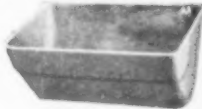
Metal very resistant to corrosion and severe usage.

Buckets are furnished in many sizes in a wide variety of styles suitable for either chain or belt mounting.

Efficient, accurate transportation and delivery over a long life is assured for all suitable bulk materials.



Style A



Style AA



Style B



Style C

LINK-BELT COMPANY

Chicago 9, Indianapolis 8, Philadelphia 42, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 27, Seattle 4, Toronto 8, Johannesburg. Offices, Factory Branch Stores and Distributors in Principal Cities.

HETHERINGTON & BERNER

DREDGING PUMPS



performance-proven on the toughest jobs

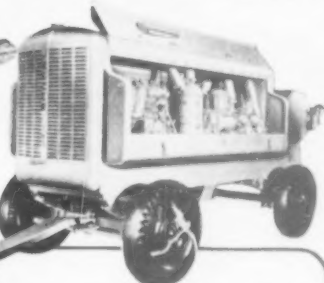


Hetherington & Berner sand and gravel pumps are available in two general types: **STANDARD**, (4", 6" and 8" sizes) with semi-steel parts, for ordinary working conditions and moderate heads; and **DRED-N-M-GHT**, (6", 8", 10", 12" and 15" sizes) with manganese steel parts, for heavy duty jobs with stringent head conditions.

Write for Bulletin DP-147

HETHERINGTON & BERNER INC.
717 Kentucky Ave. Indianapolis 7, Indiana

4 DAYS' FOOTAGE DRILLED IN 3 with JAEGER "air-plus" pressure



75
cfm

125
cfm

185
cfm

250
cfm

365
cfm

600
cfm

Old compressor ratings, set in 1932, underpower today's tools. Jaeger delivers enough 100 lb. air to maintain steady full pressure behind heavy tools, make them hit harder and faster, actually increase production 30% to 100% with the same men and tools. Ask your Jaeger distributor.

THE JAEGER MACHINE COMPANY
603 Dublin Ave., Columbus 16, Ohio

Sales, Rentals and Service in 130 Cities of United States and Canada

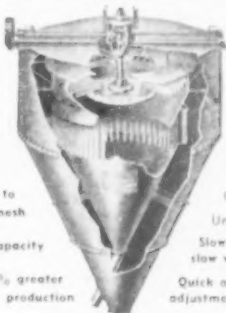
PUMPS • MIXERS • HOISTS • PAVING EQUIPMENT

GAYCO CENTRIFUGAL SEPARATORS

GAYCO Separators, equipped with the adjustable centrifugal sizing fan—an exclusive GAYCO feature—make closer separations. Closer separations bring about higher production through efficient removal of the fines made by the mill. Closer separations bring about higher quality products by eliminating all undesirable oversize.

"TIMKEN BEARING EQUIPPED"

GAYCO brings you all these:



Range 60 to 400 mesh

Greater capacity

25 to 30% greater production

Cleaner Tailings

Uniform Products

Slow speed for slow wear

Quick and easy adjustments

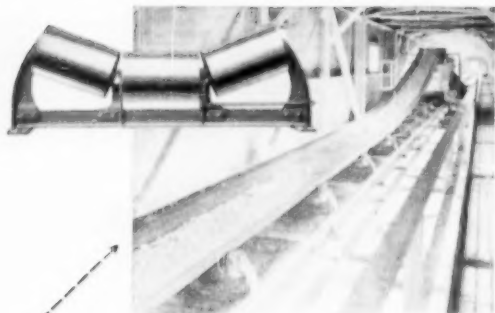
If you have an exceptionally hard separating problem, TRY THE GAYCO.

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For Lower Handling Costs Use

LINK-BELT "100" Belt Conveyor Idlers

Link Belt "100" series belt conveyor idlers offer outstanding service features for better sand, gravel and stone handling. GREASE-IN-DIRT-OUT SEAL prevents harmful matter from reaching bearings. . . . ROLLS with smooth rounded-edge outer shell minimize belt wear. . . . HIGH-GRADE ROLLER BEARINGS. . . . INTERLOCKING NUTS AND YOKES prevent brackets from spreading under unusual impact. . . . END BRACKETS of tough malleable iron in reinforced T-section withstand heavy loads. . . . GREASE FITTINGS for rolls, protected within end bracket.

Complete Link-Belt Line Includes: Traughed Belt Idlers • Return Belt and Flat Belt Idlers • Belt Training Idlers for All Belts • Rubber Tread Traughed Belt Impact Idlers • Rubber Tread Return Idlers • Special Types and Designs

LINK-BELT COMPANY Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 73, Seattle 4, Toronto 8. Offices, Factory Branch Stores and Distributors in Principal Cities.

**PERFORATED METAL
SAND AND GRAVEL SCREENS**
Manufactured exactly to your specifications
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices

CHICAGO PERFORATING CO.
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**HAYWARD
WON'T QUIT
OR CAUSE TIME OUT**
A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

THE HAYWARD COMPANY
202-204 Fulton Street
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Specify STANDARD

when you need

ELEVATOR BUCKETS

Standard designs or special buckets to your order. Skilled service in a well-equipped plant specializing in replacement buckets. Welded or riveted construction. Sizes up to 48" long, 1/4" steel. Large or small orders given prompt and individual attention. Write for our low prices.

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WOVEN WIRE SCREENS

ACCURATE • DURABLE • ECONOMICAL

The reliability of T.C. Alloy Screens has carried them into all parts of the world. Made in Standard and Special Weaves, with Square or Oblong Openings - from 10 mesh, .035" wire on up. Write today for Catalog No. 42.

TWIN CITY IRON & WIRE CO.
35 W. WATER STREET • ST. PAUL 1, MINNESOTA

CLASSIFIED ADVERTISEMENTS

FOR SALE
Two Bradley Giant Griffin Mills one new in 1943, other new in 1961. Also used Kent mill, one Loomie 44 traction drive electric driven well drill and one Kador dust collector. All in good operating condition.

ACME LIMESTONE COMPANY
Fort Spring, West Virginia

FOR SALE
Hanson Model 30 Dragline with Hendrix 1/2 yd. perforated bucket. This machine has operated less than 1000 hours. In good condition. Can be purchased at a sacrifice.

Curtis C. Benson Waconia, Minn.

FOR SALE
29 acres of property located in Bethel, Connecticut with large deposit Isolomite, property served by the New Haven Railroad on a six car siding.

THE DEXTONE COMPANY
P.O. Box 606 New Haven, Conn.

ROCK PLANT EQPT.
K5-250-100 will mill 40 ton hr. hard rock (not complete with screens, crushers, 4 electric motors, starters and switch-box).

Box J-18 c/o ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

FOR SALE
One No. 50 Imp. Raymond Pulverizer complete, one Rotary dryer 48"x90" with smoke stack 36"x60" all in good condition.

CONRAD BRICK & TILE FACTORY
New Iberia, La.

WANT TO EXCHANGE, SHOVEL
Have a 104 Northwest 1 1/2 cu. yd. shovel Cummins diesel 150 HP motor, new P.B. bucket. Motor in good shape, cab rough. Shovel needs some work on clutch and shaft. Will do heavy work. Want to exchange this for a 3 cu. yd. shovel.

BILBREY LIME COMPANY
Box 111 Murfreesboro, Tenn.

FOR SALE

FOR SALE

1 1/2 yd. Model 6 Northwest Crane Dr. Dne. gas \$10,500
 1 1/2 yd. N. W. Model 104 Stripper 8000. el 20' dragline, diesel \$8,750
 1 1/2 yd. Lima 101 Gas Shovel \$7,200
 3/4 yd. General Shovel, Crane boom, 1200 powered \$3,800
 1/2 yd. K2 Bay City Shovel, Crane 8 4,800
 3/4 yd. Unit Crane, Gas on 12 rubber tires \$10,500
 1 1/2 yd. 100 3-Drum Steam Hoist with Hoist \$1,200
 3/4 yd. Re-Hand, Clamshell Teeth 8 750
 3/4 yd. Clamshell with Teeth 8 475
 90' Austin Diesel Power Grader 13' Blade \$2,500
 Adams "51" Diesel Power Grader 13' Blade \$2,100
 Adams "301" Gas Power Grader 12' Blade \$1,800
 8"x8" Dayton Diesel Centr. Pump for HP Motor \$850
 100' Troughed Belt Conv. Frame only, Head and Tail 24" \$1,800
 80' Troughed Belt Conv. 140' 24" belt Complete \$1,500
 3 1/2 yd. Per Min. Bucket Loaders 1000 and B-4 \$3,500
 24"x36" "NEW" Pioneer Jaw Crusher \$12,500
 100 to 300 HP Steam Boilers, other sizes also \$25.00 per HP and Up
 7 Ton 30" Dia. Plymouth Gas Loco. 5-1-1 yd. Cars \$3,000

New Cement Bins complete with Elevator, Weigh Hatcher, Motor, Conductor Package, 250 ton \$25,000, 400 ton \$6,250. We have all kinds of equipment. Let us know what you want to buy or sell.

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Need RAILS?

MOST COMPLETE STOCKS IN U. S.
 OF NEW AND RELAYING RAILS

Faster matches sizes and specifications to meet all rails requirements.

STEEL SHEET PILING

RENT IT! . . .

Largest warehouse stocks. The exact length and the exact section when you need it—at lowest rental rates. Also Corrugated Steel Sheet Piling, Rent Pile Hammers and Extractors.

**STEEL PIPE • WIRE ROPE
 WIRE SLINGS • STEEL PLATES**

Foster warehouses extensive stocks of these items to fill every need.

LEE FOSTER Co.

PITTSBURGH 30, PA. CHICAGO 4, ILL.
 HOUSTON 2, TEX. NEW YORK 7, N.Y.

FOR SALE

Six (6) 8"3" x 15"11" Efficient Multitube Indirect Rotary Coolers by Traylor for Lime and Alumina Oxide

THOMAS M. BROWN

1315 Oliver Bldg.—Pittsburgh, Pa.

LORAIN 40-A SHOVEL—3/4 cu. yd. w/MZR Waukesha engine, 22' trends, cab, Serial No. 5913. Price, \$7,000.00 ASK FOB UNIT No. 1101.

MODEL H-3 BUCYRUS ERIE HYDROCRANE—3/4 cu. yd. clamshell bucket comp. w/Tugline, mtd. on 1949 HIC truck. Used very little—practically new. Price \$8250.00. ASK FOR UNIT No. 1104.

CLYDE No. 7223 DOUBLE DRUM HOIST w/D-201 Le Roi Engine. Price \$1975.00. ASK FOR UNIT No. 1403.

HLD-A HOUGH PAYLOADER—8-25-20 10-ply front, 12-00-24 8-ply dual rear tires, 60" wide bucket, 6 bucket teeth mtd. on bucket, gravity dump, starter, hoodside doors, muffler. Year 1947. Price \$4250.00. ASK FOR UNIT No. 407.

DOW & COMPANY, INC.

1820 Elmwood Ave.
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WINTER CLEARANCE

Box "27E" Paver, big drum. Ready to work.
 Blaw-Knox 3 yd. truck mixers w/ Trucks. Cheap
 Universal—No. 3 Rebuilt 18x21" Pulverizer
 Gilson—"14" Used Pulverizer \$250.00
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 Cedarapids—Portable Pulverizing Plant
 3XH Gravelier 42x8" Screen, 36x80" Apron Feeder, Cummins Diesel power.
 Universal—Portable Primary Crushing Plant, apron feeder, 20x30" box crusher, diesel power etc.
 International—"TD-14" Diesel Tractor w/ Dozer and D-11 PCT
 A.C.—"HD-7" Diesel Tractor w/Hydraulic Dozer
 Diamond 21 yd. Jack Let Bin New
 Conveyor Belting—"18", "24" and "30" in stock

EIGHTHY EQUIPMENT COMPANY
 Pierpont at W. State St., Rockford, Ill.

RUBBER CONVEYOR BELTING

At Lower Prices

Top Quality—Immediate Delivery
 12" widths to 36" (All plies)
TRANSMISSION BELTING
AIR HOSE (All sizes)
SUCTION AND DISCHARGE HOSE
WATER HOSE
V BELTS

Also Mill Remnants

Write or wire collect for prices and samples

E. D. HEHNS & SON

1286 Hollywood Ave., Memphis, Tenn.

FOR SALE

valley Rapids Primary unit multi crushing plant used only 200 hours. Immediate delivery. FOB Car Mounted on Rubber, chain jaws and pulleys. Barazin
JAMES C. MILLER CO.
 Taylor County Bank Bldg.
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DIESEL GENERATOR SET

SUPERIOR DIESEL MODEL G.A. 4 Crocker Wheeler Generator and Excitor

Size 30-8.6, Alternating Current, 3 phase 60 cycle, 240 Amp., 37.5 K.V.A.

Westinghouse Automatic Voltage Regulator

Weston Electric Instruments
 In Very Good Condition

Priced for Quick Sale.

JESSE S. MORIE & SON, INC.

Mauricetown, New Jersey

FOR SALE

One used Butler 225 Hbl. cement bin with long legs, 1000 lb. used Butler cement hatcher, 35' chain belt cement elevator with gasoline engine, etc.

One used Blaw Knox 51-ton 2-compartment bin with used 1 cu. yd. weighing hatcher.

Two used 3 yard horizontal discharge Ingersoll machines mounted on model 502 GMC trucks with Grison tandem axles.

All of the above in good condition and working every day. Address

FOSTER SUPPLY CO.

P.O. Box 535 Port Huron, Mich.

FOR SALE

SAND PIT having state specification material and 20 million E. of Cleveland, 1 1/2 mile off I. S. Highway on paved road. In operation. With or without equipment.

W. W. METCALF
 Route 2 Willoughby, Ohio

FOR SALE

1 cu. yd. Southern Lumber Company 40 ft. steel mesh 40' high washing bucket. 2 used truck cranes, 10' H.P. Waukesha gas power unit, cement mixer, 40' gas engine 1 1/2 cu. yd. truck, 125 ft. long, 1 1/2 cu. yd. New 1/2 cu. yd. low capacity 1 cu. yd. bucket with 2 wheel carrier. Necessary cleanup, crane, etc. available. Also some new and used cranes. Equipment in extra good. Also a mobile crane. Material for 1 cu. yd. cement. Send inquiry, will send check.
MUELLER SAND & GRAVEL CO. Hanover, Kan.

FOR SALE

Used Model 71 10-02, Reoline 6" Driller, equipped but not with new Hercules Model 42500 Gasoline Motor, but some new engine required, suitable for use in small quarry or could be converted for use as a Water Wash or as a pump. For additional inspection at our quarry, Brown Co.

LONGHORN PORTLAND CEMENT CO.
 1200 Transit Tower San Antonio, Texas

FOR SALE

Double Drum Hoist with 100 HP Electric Motor. A condition.

B. L. Larsen & Son
 Cedar Falls, Iowa

**RAILS—NEW AND RELAYING
 CARS—NEW AND USED—ALL
 TYPES**

M. K. FRANK
 480 Lexington Ave. Park Building
 New York City, Penna.
 105 Lake St., Reno, Nevada

FOR SALE

USED EQUIPMENT FOR SALE

- 1- $\frac{3}{4}$ Yd. Shovel, Model B Northwest Caterpillar, Year Model 1929—Serial No. 2066 Powered with Wisconsin Gas Engine. Condition: Good. Motor Overhauled 1949. Price: \$4,000.00.
- 2- Shovel Fronts for $\frac{3}{4}$ Yd. Bucyrus-Erie Type B Steam Shovels, Booms, Stricks and Dippers. Condition: Excellent. Price: \$500.00 each.
- 1- Speed Reducer, Model 910A Falk, 100 H.P. Complete with Couplings Ratio 11.5 to 1. Shaft Dia.—Input 2", Output 5". Condition: Excellent. Price: \$1,000.00.
- 1- Electric Converter, Model FVCS Re-Raxco, 15g H.P.—8 KVA—440 V.—60 Cy.—3 Phase Continuous 40°C RPM 900. Condition: Good. Price: \$350.00.
- 1- Air Compressor, 220 ft. Ingersoll Rand Single Stage, Mounted on International Truck Chassis. Condition: Compressor and Trucks—Complete Unit—Good. Price: \$1,000.00.
- 1- Draft Fan, Model 55 CWIRED Ameri-con Blower Type E. Condition: Good. Price: \$200.00.
- 1- Roll Crusher, Martin, 18" Style P. Condition: Good. Price: \$400.00.
- 1- Sectional Belt Conveyor, Fairbanks No. 346 14'x17' with Motor 1 H.P. AC 3 Phase—60 Cy 440V. Condition: Good. Price: \$200.00.
- 2- Well Drills, Leomin Model 44 Chipper Full Chisel Blast Hole. Condition: Excellent. Price: \$4,500.00 each.
- 1- Well Drill, Leomin Model 44 Chipper Half Track Blast Hole. Diesel Powered. Condition: Good. Price: \$1,000.00.
- 1- Well Drill, Leomin Model 44 Chipper Blast Hole, Non-Traction. Diesel Powered. Condition: Good. Price: \$1,000.00.
- 1- Well Drill, Leomin Model 44 Chipper Blast Hole, Non-Traction. Diesel Powered. Condition: Good. Price: \$1,000.00.
- 1- Scale, Exact Weight Style No. 2225 50 lb. Tare Beam, DGE 25 lb. Under 5 lbs. Over with Double Jug holder. Condition: Good. Price: \$250.00.

THOMASVILLE STONE & LIME CO.
Thomasville, Pa.



PIPE — Small and Large Diameter, from our Stock

Welded
Seamless
Corrugated

Supplies of Fittings
Valves and Tube Turns
Power Piping Fabrication
SPEED-LAY Pipe System
Quick Assembly
Economical, Light Weight
Write for Brochure

ALBERT
PIPE SUPPLY CO., INC.
Berry at North 13th Sts., Brooklyn 11, N. Y.
Phone: EVergreen 7-8100

LIQUIDATIONS!

- 2—Hough Payloaders Model H.L.A. 1 1/2 cu. bucket
- 10—Belt Conveyors 20" 30" to 48" centers
- 14—Bucket Elevators 6"x14" to 16"x14" buckets to 14' centers
- 6—Tyler Screens 3'x5' Tandem, Triple Deck
- 1—Raymond 3-Roll High Side Mill
- 3—Oliver 14" 6"x18" Rotary Filters
- 2—Vulcan 9"x12" Rotary Kilns
- 2—Link Belt 7"x15" Rotary Kilns
- 1—Rotary Dryer 6'x50'
- 1—Barnett 3'x35" Rotary Cooler
- 3—Riley Screens 10"x120"
- 1—Taylor 5'x10" Rod Mill
- 1—Macy 7'x16" Rod Mill
- 20—Harrington Ball Mills, 8'x22", 5'x36"
- 1—Patterson Ball Mill 6'x16"
- 1—Patterson Ball Mill 3'x10"
- 1—Barnett 5'x22" alloy lined Tube Mill
- 1—Jeffrey 20"x12" Hammer Mill
- 1—Patrol 36"x24" Jaw Crusher
- 1—Blake 10"x18" Jaw Crusher
- 500—Screw Conveyor, 12" and 16"

PARTIAL LIST
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BRILL EQUIPMENT COMPANY
2401 Third Ave., New York 51, N. Y.

FOR SALE

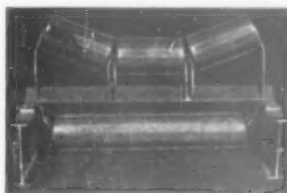
- 1—Kent Maximator, Type No. 7 Ring Roll Mill and Drive
 - 1—Sturtevant No. 2 Ring Roll Mill and Drives
 - 1—Surreyport No. 1 Ring Roll Mill
 - 1—Pair Rolls, Allis Chalmers 10" x15" Amavonda. Completely rebuilt
 - 1—No. 42 Champion Jaw Crusher, 10"x20"
 - 1—Jeffrey Swing Hammer Mill, Type B, 24"x20"
 - 1—No. 6 Champion Jaw Crusher, 12"x20"
 - 1—18" Link-Belt Apron Conveyor—6" pitch, 27' centers
- Bucket Elevators, open and totally enclosed, new and used as is or rebuilt.

JOHNSON & HOEHLER, INC.
P.O. Box 102 Lansdowne, Pa.

CONVEYORS — FEEDERS CONVEYOR IDLERS VIBRATING SCREENS SCALES — CRUSHERS

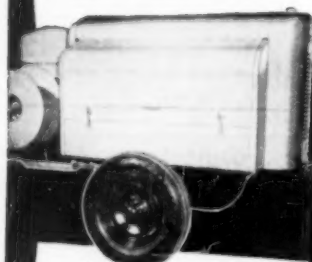
GUARANTEED EQUIPMENT
IMMEDIATE SHIPMENT

TROUGHING IDLERS AND ROLLERS



3-roll Troughing Idlers for these sizes			
12" belt	\$10.00	18" belt	\$10.00
24" belt	15.00	36" belt	20.00
18" belt	22.00	36" belt	25.00
30" belt	30.00	42" belt	35.00
36" belt	35.00	42" belt	40.00
42" belt	40.00	48" belt	45.00
48" belt	45.00	54" belt	50.00
54" belt	50.00	60" belt	55.00
60" belt	55.00	66" belt	60.00
66" belt	60.00	72" belt	65.00
72" belt	65.00	78" belt	70.00
78" belt	70.00	84" belt	75.00
84" belt	75.00	90" belt	80.00
90" belt	80.00	96" belt	85.00
96" belt	85.00	102" belt	90.00
102" belt	90.00	108" belt	95.00
108" belt	95.00	114" belt	100.00
114" belt	100.00	120" belt	105.00
120" belt	105.00	126" belt	110.00
126" belt	110.00	132" belt	115.00
132" belt	115.00	138" belt	120.00
138" belt	120.00	144" belt	125.00
144" belt	125.00	150" belt	130.00
150" belt	130.00	156" belt	135.00
156" belt	135.00	162" belt	140.00
162" belt	140.00	168" belt	145.00
168" belt	145.00	174" belt	150.00
174" belt	150.00	180" belt	155.00
180" belt	155.00	186" belt	160.00
186" belt	160.00	192" belt	165.00
192" belt	165.00	198" belt	170.00
198" belt	170.00	204" belt	175.00
204" belt	175.00	210" belt	180.00
210" belt	180.00	216" belt	185.00
216" belt	185.00	222" belt	190.00
222" belt	190.00	228" belt	195.00
228" belt	195.00	234" belt	200.00
234" belt	200.00	240" belt	205.00
240" belt	205.00	246" belt	210.00
246" belt	210.00	252" belt	215.00
252" belt	215.00	258" belt	220.00
258" belt	220.00	264" belt	225.00
264" belt	225.00	270" belt	230.00
270" belt	230.00	276" belt	235.00
276" belt	235.00	282" belt	240.00
282" belt	240.00	288" belt	245.00
288" belt	245.00	294" belt	250.00
294" belt	250.00	300" belt	255.00
300" belt	255.00	306" belt	260.00
306" belt	260.00	312" belt	265.00
312" belt	265.00	318" belt	270.00
318" belt	270.00	324" belt	275.00
324" belt	275.00	330" belt	280.00
330" belt	280.00	336" belt	285.00
336" belt	285.00	342" belt	290.00
342" belt	290.00	348" belt	295.00
348" belt	295.00	354" belt	300.00
354" belt	300.00	360" belt	305.00
360" belt	305.00	366" belt	310.00
366" belt	310.00	372" belt	315.00
372" belt	315.00	378" belt	320.00
378" belt	320.00	384" belt	325.00
384" belt	325.00	390" belt	330.00
390" belt	330.00	396" belt	335.00
396" belt	335.00	402" belt	340.00
402" belt	340.00	408" belt	345.00
408" belt	345.00	414" belt	350.00
414" belt	350.00	420" belt	355.00
420" belt	355.00	426" belt	360.00
426" belt	360.00	432" belt	365.00
432" belt	365.00	438" belt	370.00
438" belt	370.00	444" belt	375.00
444" belt	375.00	450" belt	380.00
450" belt	380.00	456" belt	385.00
456" belt	385.00	462" belt	390.00
462" belt	390.00	468" belt	395.00
468" belt	395.00	474" belt	400.00
474" belt	400.00	480" belt	405.00
480" belt	405.00	486" belt	410.00
486" belt	410.00	492" belt	415.00
492" belt	415.00	498" belt	420.00
498" belt	420.00	504" belt	425.00
504" belt	425.00	510" belt	430.00
510" belt	430.00	516" belt	435.00
516" belt	435.00	522" belt	440.00
522" belt	440.00	528" belt	445.00
528" belt	445.00	534" belt	450.00
534" belt	450.00	540" belt	455.00
540" belt	455.00	546" belt	460.00
546" belt	460.00	552" belt	465.00
552" belt	465.00	558" belt	470.00
558" belt	470.00	564" belt	475.00
564" belt	475.00	570" belt	480.00
570" belt	480.00	576" belt	485.00
576" belt	485.00	582" belt	490.00
582" belt	490.00	588" belt	495.00
588" belt	495.00	594" belt	500.00
594" belt	500.00	600" belt	505.00
600" belt	505.00	606" belt	510.00
606" belt	510.00	612" belt	515.00
612" belt	515.00	618" belt	520.00
618" belt	520.00	624" belt	525.00
624" belt	525.00	630" belt	530.00
630" belt	530.00	636" belt	535.00
636" belt	535.00	642" belt	540.00
642" belt	540.00	648" belt	545.00
648" belt	545.00	654" belt	550.00
654" belt	550.00	660" belt	555.00
660" belt	555.00	666" belt	560.00
666" belt	560.00	672" belt	565.00
672" belt	565.00	678" belt	570.00
678" belt	570.00	684" belt	575.00
684" belt	575.00	690" belt	580.00
690" belt	580.00	696" belt	585.00
696" belt	585.00	702" belt	590.00
702" belt	590.00	708" belt	595.00
708" belt	595.00	714" belt	600.00
714" belt	600.00	720" belt	605.00
720" belt	605.00	726" belt	610.00
726" belt	610.00	732" belt	615.00
732" belt	615.00	738" belt	620.00
738" belt	620.00	744" belt	625.00
744" belt	625.00	750" belt	630.00
750" belt	630.00	756" belt	635.00
756" belt	635.00	762" belt	640.00
762" belt	640.00	768" belt	645.00
768" belt	645.00	774" belt	650.00
774" belt	650.00	780" belt	655.00
780" belt	655.00	786" belt	660.00
786" belt	660.00	792" belt	665.00
792" belt	665.00	798" belt	670.00
798" belt	670.00	804" belt	675.00
804" belt	675.00	810" belt	680.00
810" belt	680.00	816" belt	685.00
816" belt	685.00	822" belt	690.00
822" belt	690.00	828" belt	695.00
828" belt	695.00	834" belt	700.00
834" belt	700.00	840" belt	705.00
840" belt	705.00	846" belt	710.00
846" belt	710.00	852" belt	715.00
852" belt	715.00	858" belt	720.00
858" belt	720.00	864" belt	725.00
864" belt	725.00	870" belt	730.00
870" belt	730.00	876" belt	735.00
876" belt	735.00	882" belt	740.00
882" belt	740.00	888" belt	745.00
888" belt	745.00	894" belt	750.00
894" belt	750.00	900" belt	755.00
900" belt	755.00	906" belt	760.00
906" belt	760.00	912" belt	765.00
912" belt	765.00	918" belt	770.00
918" belt	770.00	924" belt	775.00
924" belt	775.00	930" belt	780.00
930" belt	780.00	936" belt	785.00
936" belt	785.00	942" belt	790.00
942" belt	790.00	948" belt	795.00
948" belt	795.00	954" belt	800.00
954" belt	800.00	960" belt	805.00
960" belt	805.00	966" belt	810.00
966" belt	810.00	972" belt	815.00
972" belt	815.00	978" belt	820.00
978" belt	820.00	984" belt	825.00
984" belt	825.00	990" belt	830.00
990" belt	830.00	996" belt	835.00
996" belt	835.00	1002" belt	840.00
1002" belt	840.00	1008" belt	845.00
1008" belt	845.00	1014" belt	850.00
1014" belt	850.00	1020" belt	855.00
1020" belt	855.00	1026" belt	860.00
1026" belt	860.00	1032" belt	865.00
1032" belt	865.00	1038" belt	870.00
1038" belt	870.00	1044" belt	875.00
1044" belt	875.00	1050" belt	880.00
1050" belt	880.00	1056" belt	885.00
1056" belt	885.00	1062" belt	890.00
1062" belt	890.00	1068" belt	895.00
1068" belt	895.00	1074" belt	900.00
1074" belt	900.00	1080" belt	905.00
1080" belt	905.00	1086" belt	910.00
1086" belt	910.00	1092" belt	915.00
1092" belt	915.00	1098" belt	920.00
1098" belt	920.00	1104" belt	925.00
1104" belt	925.00	1110" belt	930.00
1110" belt	930.00	1116" belt	935.00
1116" belt	935.00	1122" belt	940.00
1122" belt	940.00	1128" belt	945.00
1128" belt	945.00	1134" belt	950.00
1134" belt	950.00	1140" belt	955.00
1140" belt	955.00	1146" belt	960.00
1146" belt	960.00	1152" belt	965.00
1152" belt	965.00	1158" belt	970.00
1158" belt	970.00	1164" belt	975.00
1164" belt	975.00	1170" belt	980.00
1170" belt	980.00	1176" belt	985.00
1176" belt	985.00	1182" belt	990.00
1182" belt	990.00	1188" belt	995.00
1188" belt	995.00	1194" belt	1000.00
1194" belt	1000.00	1200" belt	1005.00
1200" belt	1005.00	1206" belt	1010.00
1206" belt	1010.00	1212" belt	1015.00
1212" belt	1015.00	1218" belt	1020.00
1218" belt	1020.00	1224" belt	1025.00
1224" belt	1025.00	1230" belt	1030.00
1230" belt	1030.00	1236" belt	1035.00
1236" belt	1035.00	1242" belt	1040.00
1242" belt	1040.00	1248" belt	

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485 COLLEGE STREET

INDEX TO DISPLAY ADVERTISERS

Allied Chemical & Dye Corp.	188	Kent Machine Co.	199
Allis-Chalmers	31, 35, 149,	Koeberling Company	28, 29
Inside Back Cover		Kraft Bag Corporation	153
Allis-Chalmers, Tractor Div.	49	Leschen, A. & Sons Rope Co.	150
American Brake Shoe Co.	58	LeTourneau, R. G., Inc.	24, 25
Electro-Alloys Division	58	Link-Belt Co.	11, 202, 203, 204
American Cyanamid Co.	57	Lippmann Engineering Works	21
Austin-Western Co.	42	Lith-I-Bar Co.	194, 195
Automatic Spring Coiling Co.	192	Lone Star Cement Corp.	180
Barber-Greene Co.	17, 18, 19, 20	Mack Motor Truck	
Baughman Mfg. Co., Inc.	153, 193	Corp.	Inside Front Cover
Bay City Shovels, Inc.	23	Manhattan Rubber Div.	26
Bemis Bro. Bag Co.	61	Marion Power Shovel Co.	6
Berg Vault Co.	198	Merrick Scale Mfg. Co.	165
Bin-Dicator Co.	202	Mine & Smelter Supply Co.	150
Boston Woven Hose & Rubber Co.	55	Multiplex Machinery Corp.	198
Bucyrus-Erie Co.	27	Murphy Diesel Company	151
Buell Engineering Co.	32	National Concrete Masonry	
Cape Ann Anchor & Forge Co.	167	Association	178
Caterpillar Tractor Co.	12, 13	Naylor Pipe Co.	158
Celotex Corp.	188	New Haven Vibrator Co.	189
Chain Belt Co.	138, 176, 177	Nichols Engineering & Research	
Chase Bag Co.	143	Corp.	167
Chevrolet Motor Division	39	Nordberg Mfg. Co.	31
Chicago Perforating Co.	204	Northern Blower Co.	41
Chicago Pneumatic Tool Co.	43	Northwest Engineering Co.	5
Chicago Steel Foundry Co.	168	Oliver Corp.	68
Cleveland Wire Cloth & Mfg. Co.	171	Oswalt Engineering Service	
Coe Mfg. Co.	50	Corp.	190
Columbia Machine Works	192	Overstrom & Sons	202
Combustion Engineering		Pennsylvania Dixie Cement	
Superheater, Inc.	8, 9	Corp.	191
Concrete Equipment Co.	198	Quaker Rubber Corp.	145
Concrete Transport Mixer Co.	193	Quinn Wire & Iron Works	165
Cook Bros. Equipment Co.	190	Raybestos-Manhattan, Inc.	26
Curtier's Enterprises	191	Raymond Pulverizer Division	8, 9
Davenport Locomotive Works	202	Resisto-Loy Co.	201
Demister Brothers	10	Roebbling's, John A., Sons Co.	142
Denver Equipment Co.	15	Rogers Iron Works Co.	164
du Pont, E. I., de Nemours		Ryerson, Jos. T., & Son, Inc.	152
& Co., Inc.	14	Saunders Bros., Inc.	170
Eagle Iron Works	62	Sauer Equipment Co., Inc.	161
Easton Car & Const. Co.	3	Simplicity Engineering Co.	60
Eaton Mfg. Co.	137	Sly, W. W., Mfg. Co.	166
Ehrson, J. R., & Sons	59	Smith, F. L., & Co.	54
Ensign-Bickford Co.	4	Smith, T. L., Co.	179
Erie Steel Construction Co.	45	Smith Engineering Works	147
Farrel Bacon	169	Smith, Gordon, & Co.	210
Farouhar, A.-B., Co.		Solvay Sales Division	188
Conveyor Division	187	Standard Metal Mfg. Co.	204
Fuller Company	48	Stephens-Adamson Mfg. Co.	30
Gardner-Denver Co.	22	Stulz-Sickles Co.	116
Gates Rubber Co.	16	Sturtevant Mill Co.	34
General Motors Corp.	39	Supremix, Inc.	171
Gerlinger Carrier Co.	190	Syntro Co.	169
Goodall Rubber Co.	167	Texas Company	72
Goodyear Tire & Rubber		Thermoid Company	157
Co.	Inside Back Cover	Thew Shovel Company	35
Gruendler Crusher &		Trackson Co.	83
Pulverizer Co.	171	Traylor Engineering & Mfg. Co.	7
Gulf Oil Corp.	52	Twin City Iron & Wire Co.	204
Hais, George, Mfg. Co., Inc.	163	Tyler, W. S., Co.	168
Hammond Bag & Paper Co.	172	U. S. Electrical Motors, Inc.	37, 38
Hardinge Co., Inc.	159	Union Wire Rope Corp.	148
Harnischfeger Corporation	47	Universal Engineering Corp.	
Hayward Co.	204	Division of Pettibone Mulliken	
Hetherington & Berner Inc.	203	Corp.	66
International Harvester Co.	141	Universal Road Machinery Co.	203
Jackson & Church Co.	200	Universal Vibrating Screen Co.	152
Jacobs Machine Co.	203	Wellman Engineering Co.	201
Jeffrey Mfg. Co.	46	Western Precipitation Corp.	212
Jones, W. A., Foundry &		Wickwire Spencer Division of the	
Machine Co.	172	Colorado Fuel & Iron Corp.	61
Joy Mfg. Co.	40, 41	Willey, A. R., & Sons, Inc.	166
Kansas City Hay Press Co.	164	Williams, C. K., & Co.	189
Kennedy Van Sain Mfg. &		Williams Patent Crusher &	
Engr. Corp.	104	Pulverizer Co.	211
		Yuba Mfg. Co.	160

INDEX TO CLASSIFIED ADVERTISERS

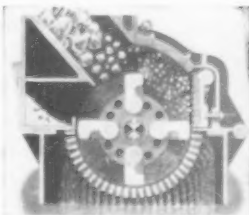
Arme Limestone Co.	204
Albert Pipe Supply Co., Inc.	207
American Concrete Service	196
Bacon-Pietseh Co., Inc.	207
Benson, Curtis Co.	204
Bilbrey Lime Company	204
Blue Ridge Tale Co., Inc.	197
Bonded Scale and Machine Co.	207
Boyer, J. C., Co.	196
Brill Equipment Company	207
Brown, Thomas M.	206
Carlyle Rubber Co., Inc.	206
Clapp, Riley and Hall Co.	196
Closterhouse, T. R.	196
Cole, William F.	197
Conrad Brick & Tile Factory	204
Darien	208
Dextone Company	204
Dow & Company, Inc.	206
Duluth Cinder, Slag & Stone Co.	196
Eighty Equipment Company	206
Equipment Service Company	196
Foster, L. R., Co.	206
Foster Supply Co.	206
Frank, M. K.	206
Furnival Machinery Co.	209
General Engines Co., Inc.	197
Granite Company	196
Hallowell, H. J.	209
Haynes Products Co.	197
Heat and Power Co.	206
Heehs, E. D., & Son	206
Heidenreich, E. Lee, Jr.	209
Hughes & Company	196
Imperial Ready Mix Concrete Co.	196
Johnson & Hochler, Inc.	207
Kelly, Robt. L.	206
Landers-Segal Color Co.	197
Lane, T. J., Co.	206
Larsen, B. L., & Son	206
Lawrence, Ollie E.	208
Longhorn Portland Cement Co.	206
Lowry, J. R.	197
Maclay Concrete Co.	197
Makin Drilling Co.	208
McLeod, Alex. T.	208
McMindes, Roy P., Co.	197
Mercalf, W. W.	206
Mid-Continent Equipment Co., Inc.	208
Midwest Steel Corporation	208
Miller, James C., Co.	206
Miss. Valley Engr. & Construction Co.	208
Mississippi Valley Btpt. Co.	208
Morie, Jesse S., & Son, Inc.	206
Mueller Sand & Gravel Co.	206
Nichols Sand & Gravel	209
Nussbaum, V. M., & Co.	208
O'Neill, A. J.	208
Palo Alto Concrete Co.	197
Pennsylvania Drilling Co.	209
Papp Concrete Products Co.	196
Roberts, C. A.	196
Ross, Don	208
Sell, R. F.	209
Smith, H. Y., Co.	208
Smith, L. B., Inc.	206
Telluride Mines, Inc.	209
Texas Foundries	196
Thomasville Stone & Lime Co.	207
Tractor & Equipment Co.	208
United Products Co., Inc.	209
Unverzagt, G. A., & Sons	209
Walsh, Richard P., Co.	206
Weiss, B. M., Co.	208
Wenzel Machinery Rental & Sales Co.	206
Wharton Cement Products Co.	197
Whitlock Quarries	206
Yellen, J. J.	196



WILLIAMS' "HEAVY-DUTY" HAMMERMILLS

Built to take 6" feed and reduce to agricultural limestone, $\frac{3}{4}$ " stone and other small sizes in *one operation*! Crushing occurs on unusually heavy breaker and grinding plate before reaching grate. This permits grates to be used for sizing only, minimizing wear. The result: more output, more quickly reduced at less operating cost.

Sectional view of Williams' "Heavy-Duty" hammermill, with heavy liners and grinding plate for limestone and other hard material. Particular attention is directed to the grinding plate adjustment which assures uniform close contact of hammers and grinding plate at all times. Also note the metal trap which provides an outlet for the escape of tramp iron.



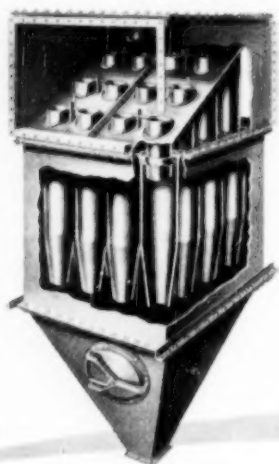
WILLIAMS ALSO MAKES...

Heavy-duty hammermills in smaller sizes for all quarry operations; impact and roller mills for 200 to 325 mesh grinding; drier mills; air separators; vibrating screens; steel bins; complete "packaged" crushing and grinding plants.

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Before you buy *any* equipment for recovering dust or fly ash...



COMPARE ALL OTHERS against MULTICLONE'S Multiple Advantages

Because the advantages of MULTICLONE are so clear-cut, so vitally important, so far-reaching in the savings they make, we urge you to make a factual unbiased comparison of MULTICLONE dust and fly ash collection equipment against *any other* in the mechanical recovery field. Only by making such a comparison can you fully appreciate the major savings and greater performance you get by installing MULTICLONE Collectors!

COMPARE Recovery Efficiency!

It is a recognized fact that the separating efficiency of a cyclonic tube increases as the tube diameter decreases because smaller tubes generate greater centrifugal forces. The patented vane in the Multiclone makes the use of small tubes practical without complicated manifolding and permits compacting many small tubes into one simple, highly efficient unit. Multiclone's higher centrifugal forces throw out not only the large, medium and small particles, but also an unusually high percentage of the extremely small particles of 10 microns and less. Result: more complete recovery of all suspended particles from the gas stream!



COMPARE Space-Saving Compactness!

Plant space costs money—particularly at today's high construction costs. Because the Multiclone is more compact, size for size, it makes *really* important savings in space and plant costs. Note in the chart how the Multiclone requires substantially less space—both in floor space and cubic space—than any other unit of comparable capacity and performance. This means vital savings in construction costs!

Make	Relative Space Requirements to Sq. Ft. in Cu. Ft.	
	Sq. Ft.	Cu. Ft.
Multiclone	1.0	1.0
Collector A	2.1	1.6
Collector B	5.9	3.2
Collector C	6.8	3.9

COMPARE Dollar-Saving Adaptability!

Savings in space is just one of many ways Multiclone reduces installation costs. Because the shape of the unit can be readily varied—long and narrow, short and wide, or square—to fit available spaces, the Multiclone can often be tucked into odd corners and waste areas too restricted for other equipment.

Moreover, inlet-outlet ducts can be varied—side-inlet side-outlet, or side-inlet top-outlet—to meet low headroom or restricted side clearance requirements—and the single-inlet single-outlet duct design permits greater flexibility and simpler installation. These all add up to vital savings in installation costs!



Side inlet, Side inlet,
Side outlet, Top outlet

COMPARE All-Around Simplicity!

The Multiclone is simple and inexpensive to maintain because there are no highspeed moving parts to repair or replace. No pads or filters to clean or renew—nothing to choke the gas flow or increase draft losses as suspended materials are recovered. In addition, the square, flat-sided shape of the Multiclone and its straight inlet and outlet ducts are far simpler to install and insulate. And since the recovered material from an entire bank of tubes is collected in a single hopper, it is much easier to service and maintain than the multiple hoppers of conventional cyclone units. Here again, the Multiclone saves in many ways—all of them important!



Whether your recovery installation is in a new structure or for modernizing present equipment, you will be far ahead by installing MULTICLONE Collectors. Our experienced engineers will gladly make helpful suggestions for simplifying your recovery problems. A letter, wire or call to our nearest office places this assistance at your service without obligation.



Send for Helpful Literature! This factual MULTICLONE literature explains the basic principles of cyclonic dust recovery and gives technical data helpful to anyone contemplating a dust or fly ash recovery installation. Write today for your free copy!



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INDEX TO ROCK PRODUCTS, VOL. 53

A		ARTICLE		Issue	Page	B		Issue	Page	C		Issue	Page					
ACCEPTABLE AGGREGATES FROM LOW GRADE DEPOSITS		C. V. Fyfe and J. D. Sheehan		Feb.	115	BUILDING READY-MIXED CONCRETE VOLUME THROUGH SOUND MERCHANDISING		A common sense approach to selling, emphasizing service, facts and courtesy increases business and reputation of Ready Mixed Concrete Inc., Mansfield, Ohio		L. David Mink	Jan.	209						
ACCURATE BATCHING OF CONCRETE MATERIALS		Ready mix plant at Turner Groves, Ca. has electrically-controlled automatic scales and features design details for high speed operation		Jan.	202	BURNING CEMENT IN SHAFKILNS		European plants have successfully adapted shaft kilns for cement manufacture, thermal efficiency and general operation compare favorably with performance of rotary kilns		Dr. Steven Gottlieb	Oct.	113						
CENTRAL PRE-MIX CONCRETE CO. has system for accurately controlling mechanical features of concrete		W. B. Lenthart		Nov.	118	CALAVERAS' DUST DAMAGE SUIT		Dr. Oliver Bowles		Oct.	119							
ADD AIR-ENTRAINING AGENTS AT MIXER		Greater control of quality of concrete claimed by this method as compared to use of air-entraining cements based upon study of tests and factors influencing properties of concrete		J. A. Nicholson	Jan.	211	CALCINATION OF CARBONATE SLUDGE		City of Miami, Florida has rotary kiln plant to recover values from water treatment process by producing its lime		supplement W. B. Lenthart and C. K. Atkinson	Mar.	106					
AGRICULTURAL LIMESTONE CAN BE SOLO		Sales strategy should recognize the farmer as an individual to be called upon by qualified personnel in promotion of agricultural limestone		April	107	CATALINA ISLAND STONE QUARRY		Graham Bros., Los Angeles, Calif., resumes operations on island with new small-scale crushed stone plant after lapse of many years		Emphron is on large stone sizes dropped to be handled by barge	W. B. Lenthart	Aug.	144					
AGRICULTURAL LIMESTONE IN BRITAIN		Subsidies cover half the cost of material and haulage. Check formations are easy to process and are widely used.		Gilbert Davis	April	111	CEMENT COMMITTEE MEMBERS MOVED AT A.I.T.M. MEETING		CEMENT EXECUTIVES' COMMENT ON DISTRIBUTION AND MILL CAPACITY		Majority of manufacturers dispute F.A.B. prices. Production capacity considered appropriate adequacy for handling high demands. Local hauls to truck transport noted.	Ben Neuberg	Aug.	141				
AGRICULTURAL LIMESTONE PROMOTION		AGED LINSEED OIL AS DISPERSING AGENT IN PORTLAND CEMENT ANALYSIS		Sept.	75	CEMENT PLANTS IN INDIA IN DEAR CAPACITY		Trs. B. Mageson		Dec.	146							
Research proves advantage of agent based on oil, used in turbidimetric determination of portland cement specific surface		W. J. McElroy and A. S. Colwell		May	94	CEMENT AND QUARRY MEN DISCUSS HAZARDOUS OPERATIONS		CEMENT ASSOCIATION DEDICATES NEW LABORATORY		July	70							
AGGREGATES FOR WHITNEY DAM IN TEXAS		Crushed limestone and many fractured sand produced by two four-roll hammer mills and air separator. Portable crushing plants in quarry expedite production.		Ben Neuberg	Jan.	23	CEMENT PRODUCTION IN JAPAN		Geophysical papers and results of rock-free damage have limited production in face of heavy demands for construction in the years ahead		Joseph Z. Reilly	May	74					
AGGREGATES FROM MINE WASTE		Pennsylvania Aggregates Inc. processes tailings from waste rock into fine aggregate suitable for Pennsylvania Turnpike extension		W. B. Lenthart	May	94	CENTRAL MIX PLANT DEIGNED TO MINIMIZE CHARGING DELAYS		New plant of Richter Concrete Corp., Cincinnati, Ohio, utilizes 4-in. dia. cyclone hopper with 2-in. dia. central mixer to regulate batches according to truck agitation capacities, out-staying design features new plant		Oct.	116						
AGRONOMISTS' APPROACH IN RENDERING SERVICE ON FARM		William G. Gerhart		April	104	COMBINED STATIONARY AND COMBINED OPERATIONS		June		129	COOLING AGGREGATES AND CEMENT FOR DETROIT DAM		Sand and cement as well as coarse aggregates cooled for project in Oregon to hold concrete temperatures within close limits		Crushed stone plant has 1000 h.p. capacity including manufactured sand	W. B. Lenthart	Oct.	91
AGRONOMISTS' VIEWS ON SELLING		Repplies to editorial letter about value of comprehensive soil specialists to cooperate and extend work of agency experts		April	120	COOLING OF PORTLAND CEMENT		National Portland Cement Co., Bostons, Penn. installs latest design equipment for continuous cooling of mill product		Ivan Kribble	Mar.	100						
AIR RECEIVES EXPLOSION REAPPRAISED		W. B. Lenthart		May	93	CONCRETE MASONRY UNITS BOOM IN PHOENIX		Builders Supply Corp. has grown to one of nation's largest producers of lightweight units in space of five years and is supplying all types of construction projects		Jan.	204							
A.L.I. EMPHASIZES SALES PROMOTION		Operating efficiency, geology's functions and production programs also featured at annual convention		May	91	CONCRETE MASONRY UNITS MERIT A TRADE MARK		Genl. uses identifying device to provide distinction for its products and advertise machine units for trade name		Kousserian for aggressive merchandising program	Nov.	110						
AMERICAN CONCRETE INSTITUTE MEETING		Papers on pre-tensioned and precast concrete members in inspection for quality control, building codes and durability of interest to producers		April	142	CONTROL OF DUST BY WATER VAPOR		Importance of dust reduction for protection of health and equipment has led to use of many variations of water sprays, usually installed at points of high dust concentration		Royal E. Fowler	May	86						
AUTOMATIC BLOCK PLANT OPERATION		Superlite Corp., subsidiary of Builders Supply Corp., Phoenix has new plant at Colton, Cal., with controls that govern batching, conveying to mixer, mixing time, and dumping of material to belt serving block machine in sequence		W. B. Lenthart	Aug.	224	CONTROL OF TAILINGS FROM WASHING PLANTS (Part I)		Second of a series deals with methods of impounding tailings as used successfully in a hot, dry climate		W. B. Lenthart	July	72					

INDEX

ARTICLE Issue Page

COOLING RATE OF CLINKER

Arguments presented on the relative merits of cooling by air quenching and by other methods as presented in the German technical literature. B. M. Pearson Sept 86

COOLING RATE OF CEMENT CLINKER

R. G. Uhlig Dec 130

CRUSHED STONE PRODUCERS FORECAST CONTINUED PEAK DEMANDS

National convention emphasizes highway markets, durability of pavements, safety, plant operations, legislation and merchandising programs. Mar 82

CRUSHING PRACTICE AND THEORY (Part I)

Historical Summary. Brownell McGraw June 118

DEFINITIONS USED IN CRUSHER OPERATION

Brownell McGraw Sept 90

OPERATING CHARACTERISTICS OF VARIOUS TYPES OF CRUSHERS

Brownell McGraw Oct 116

CRUSHER CRUSHER CONCEPTS

Brownell McGraw Nov 92

CRUSHER REDUCTION CRUSHERS

Brownell McGraw Dec 128

D

DEALER ORGANIZATION THE FOUNDATION FOR SALES

L. J. Fitzpatrick Dec 124

DESIGN OF CONCRETE MIXES

C. J. Knudsen Feb 125

DEVELOPING A READY MIX BUSINESS

Rock Island Lumber Co. at its Potosi City, Mo., plant advertises in newspaper and over radio, firm market being developed to supplement demands of oil center. Tip Brown Sept 124

DEWEY'S EXPANSION PROGRAM COMPLETED AT DAVENPORT

Capacity increased 40 percent with an 11 x 17 ft. kiln. Business trained to rely on instruments in firing. Program also includes added floor grinding capacity, cement storage and packing, and increased slurry facilities. Bror Nordberg Aug 162

DIAGNOSIS OF SOIL CONDITIONS ESSENTIAL

Frederick G. Meikle April 100

DISPOSAL OF ABRASIVE SLUDGE

Thickener and settling basin installed to prevent pollution of Allegheny river from Pittsburgh Plate Glass Co. plant. Paul D. Ochsler Oct 142

DIVERSIFY LINE OF CONCRETE PRODUCTS

Indiana Lark Joint Concrete Pipe Co. producing bell and rubber gasket joint pipe, drain tile, manhole units, electric outlets and other specialties. July 122

DIVERSIFICATION TO "NTH" DEGREE

Harry T. Campbell Sons Corp. adds new crushing plant and black top operation; company also has ready-mixed concrete, dry batched concrete, sand and gravel, and fine grinding operations. May 98

DOUBLES CAPACITY FOR CRUSHED STONE

G. D. W. H. Condon, planter-manufacturer, opens new quarry, installs large trucks and builds new plant at Plymouth Meeting, Penn. W. B. Lenthart April 110

DOUBLES PRODUCTION OF CEMENT TO MEET DEMANDS IN PHILIPPINES

Edoardo Tuxtor Aug 152

DRAINING EXCESS WATER FROM SAND

Concrete slabs of special properties placed in water treatment plants suggested as a solution to dewatering problem. Royal E. Fowle Nov 71

EDITORIAL PAGE

Right Developments and the New Competitive Era

Economic Growth Without a Hitch

A Case in Point for a Program of Public Relations

A Course to Consider in Selling Agricultural Limestone

Depreciation and Cost of Plant Replacement

A Planned Program for Industry Research

Are We Unwittingly Laying the Groundwork for Socialism?

Legality of Freight Absorption remains a Confused Issue

How Will War Affect these Industries?

Consumer Concern Invites Labor Leaders to Board Meeting

Emphasis on Service a Guarantee of Business in Buyers Market

An Outstanding Example of Free Enterprise in Operation

Effective Merchandising of Dry Packaged Concrete

Two City Concrete Products Co., Minneapolis, Minn., undertakes a lively campaign to sell output of new Sakrete plant

Effective Products Demonstration Increases Majority Sales

Excavating Sand by Perforated Bucket

Commonwealth Sand & Gravel Co., Richmond, Va., has had successful experience with the use of a perforated-type dragline bucket to reclaim sand from settling pond

Expanding Perlite Ore in Vertical Furnace

Three grades sized by air separation in Auble Processing Corp. plant with capacity of six tons per eight hours. Furnace is fired by gas

Expansion of Perlite Ore in Stationary Kiln

Cor Life Inc., Lake Zurich, Ill., reports ore from New Mexico to produce light weight perlite aggregate for plaster

F

FARMERS NEED TECHNICAL ASSISTANCE TO DETERMINE LIMING APPLICATION RATES

Earl E. Barnes April 113

FIFTY YEARS A PRODUCER

Firing kilns with low-grade coals

Joe Ferrer Vidal April 139

FIRST ROTARY LIME KILN FOR FINLAND

John Vitercik June 135

FLEXIBILITY REQUIRED FOR DIVERSIFIED MARKETS

Shelby Rock Co., Ventura, Calif., produces sand and both washed and unwashed coarse aggregate to meet demands of all producers, obtaining ready-mixed concrete plant, similar equipment to meet many specifications. W. B. Lenthart Sept 112

FLORIDA PHOSPHATE HOLDS ATTENTION OF A.I.M.E.

All phases of production considered at Tampa meeting

Minerals Field Trip through plants. Other minerals in South also discussed. Oliver Bowles Jan 164

G

GRADING MANUFACTURED SAND

W. B. Lenthart Feb 91

GRAVEL PLANT FEATURES REMOVAL OF IMPURITIES

Consolidated Rock Products Co. solved the problem of removing sticks, clay inclusions of its Orange County operation by installing a circular set of rollers and dewatering units. W. B. Lenthart June 114

GRAVITY OPERATION IN SAND PRODUCTION

Amico Sand and Gravel Co., Morrisville, Penn., utilizes overhead rotary scrubber and washer, all sand recovery equipment rests on ground. May 56

GREAT LAKES CARBON CO. HOLDS OPEN HOUSE AT NEW PERLITE PLANT

Aug 100

GRINDING IN CLOSED CIRCUIT WITH AIR CLASSIFIER

Lehigh's \$4,000,000 program at Fordwick, Va., also comprises new kiln, storage facilities, waste-heat boiler, masonry cement mill, in addition to new raw mill. Capacity increased by 1500 tons per day. Bror Nordberg Aug 100

H

HALLIBURTON PORTLAND CEMENT COMPANY

Closed-circuit grinding of roller shells separate from other raw materials and instrumentation highlight new plant. Bror Nordberg Aug 80

HAULAGE BY RAIL AND RUBBER TIRES

New Zealand agricultural limestone producer uses standard rubber-tired tractor to push rail quarry cars to crusher. H. J. B. Tapp May 15

HAVE THE REAL FUNDAMENTALS BEEN DEVELOPED FOR MAKING GOOD CONCRETE?

Nathan C. Rockwood Feb 12

HIGH PRODUCTION PIPE PLANT FOR SEWER PROJECT IN TEXAS

Sept 100

HYDRATED DOLOMITIC LIME PRODUCED IN SMALL PLANT

June 111

I

IMPROVED CRUSHING AND GRADING OF PUMICE

W. B. Lenthart Sept 40

INCREASING CAPACITY WITH MAJOR REBUILDING

All phases of production from quarry to re-design of kiln, have added to marked increase in production at plant at Beachville plant, Gypsum, Lime and Alabaster, Ltd. J. H. Robinson Jan 80

INDUSTRIAL SAND PRODUCERS DISCUSS PROBLEMS CONFRONTING INDUSTRY

Dec 42

INDUSTRY SERVICE TO FARMERS NEEDED TO FOLLOW THROUGH SOIL PROGRAM

Firman E. Bear April 104

INTEGRATE CONCRETE OPERATIONS AT SAND AND GRAVEL PIT

Gravity flow of materials featured at both black and ready-mixed concrete operation of Jansenville Sand & Gravel Co., Jansenville, Wyo. Nov 10

J

JAPANESE CEMENT RESEARCH

Aug 100

L

LABOR RELATIONS TRENDS

Nathan C. Rockwood

Union and Government Strategies to Profit-Sharing

Details of U. S. Steel, Penn. and Welfare Plans

F.L.S.A. Administrators' Interpretations

The Case of "Getting the Florida 'Right to Work' Decision"

Pension Plan of Rock Products Producer

Supreme Court Decision on Communist Dominated Union Behind the General Motors Contract

Limitations on Plant Management

Picketing Limitations and Security Problems

Fine Distinctions Between Primary and Secondary Boycotts

Nov 41

100

215

INDEX

ARTICLE	Issue	Page	ROCK MILL OPERATIONS IN SAND PRODUCTION	STOCKPILING AND RECLAIMING STONE
PRODUCTION MEN DISCUSS LIME National Lime Association's operating division emphasizes fuel conservation. Foreign plants, material handling and research also considered.	Nov	76	Development costs of various grinding methods of production using roller discharge peripheral mills considered, as applied specifically to manufactured sand. David B. Howe, Jr.	Kingston Trap Rock Co. designs an entire plant around stockpiling system with clamshell bucket to accumulate standard railroad cars. W. B. Lenthart
PRODUCTION OF LIGHT-WEIGHT AGGREGATES Armour Research Foundation has made exhaustive study of raw materials with and without naturally expanding properties to stimulate establishment of new sources of light-weight aggregates. Thomas C. Miller	Oct	104	ROLE OF TRACE ELEMENTS AND MAGNESIUM BOTARY DRILL SPEEDS QUARRY OUTPUT Thompson Quarry of Material Service Corp. uses a rotating bit kept under continuous pressure by hydraulic power to drill blast holes.	STONE PRODUCER EXPANDS READY-MIXED CONCRETE OPERATIONS SUPPLY COMPANY ADDS READY-MIX FACILITIES Tronox-mixed concrete, new product of Lakeview Fuel and Supply Co., Mt. Clemens, Mich.
PRODUCTION PROBLEMS ANALYZED FROM QUALITY AND COST STANDPOINT PROMOTING SALES OF AGGREGATE Aggressive program of sales promotion undertaken by N.A.A.A. a principal topic of discussion at summer meeting.	Mar	78	SALES OF AGRICULTURAL LIMESTONE A FIELD-WIDE OPEN TO PROMOTION John B. Peterson	THE NATIONAL GYPSUM COMPANY STORY Burr Nordberg
PROPORTIONING BALL LEADING IN TUBE MILLS TO REDUCE POWER COSTS Dr. Ing. Egon Peelle	Oct	109	SAMPLING FLORIDA DUNE SANDS Obtaining samples of sand for test facilitated by use of a drive-pipe sampling method and the application of a water jet device, which should interest other producers. J. R. Thomsen	THERMODYNAMICS OF LIME MANUFACTURE Ralph Gelske Part I: Time and heat factors thoroughly considered along with heat losses, operation of a "perfect" kiln presented as a guide for study. Part II: Economics of fuels for rotary kiln operation, the combustion process, and the various factors influencing efficient operation are presented with reference to the design of rotary kilns. Part III: Discussion of flame lengths, combustion rate, use and effect of enriched air, heat transfer rates and kiln heat loss.
QUALITY, COSTS AND SELLING KEYNOTE ATLANTA MASONRY MEETING QUALITY CONTROL CAN BE REALIZED THROUGH FREQUENT TESTING Arnold W. Klamm	Jan	213	SAND AND GRAVEL CONVENTION SHATTERS ALL ATTENDANCE RECORDS Labor relations, business prospects, paving, land rehabilitation, safety, prospecting, specification and processing with emphasis on difficulties in quality requirements considered.	THOSE ARMY ENGINEER AGGREGATES Nathan C. Rockwood
RAW GRINDING IN VENEZUELA PLANT V. A. Asplund	Nov	60	SELLING THE FARMER ON LIMING THROUGH SPECIALIZED PERSONAL SERVICE Leonard S. Fry	TRUCK HALLAGE IN THE WESTERN STATES Company-owned trucks of a variety of designs, some of enormous capacity, including telescoping types, deliver bulk of aggregates in Pacific Coast experience deserves study by aggregates producers everywhere. W. B. Lenthart
READY-MIX FOR CONCRETE CONSTRUCTION E. H. Logan	Feb	169	SILICA PRODUCERS HOLD FIFTEENTH ANNUAL MEETING SIMPLIFIED METHOD FOR MEASURING CONSISTENCY OF CONCRETE W. J. Kelley and Norman E. Hawk	TYPICAL HYDRAULIC LIME IN THE SOUTH
READY-MIX FOR FARM PRODUCTS Ready-Mixed Concrete Co., Reading, Penn., builds modern plant to serve thriving farming area; promotional literature used in merchandising. W. B. Lenthart	July	113	SINGLE CRUSHER LIMESTONE PLANT Primary and secondary reduction of quarry-run material for agricultural limestone are accomplished by single double-impeller of Fisk quarry. Company has fleet of spreader trucks. David Macine	VALVE OF HOT COMBUSTION AIR Irving Warner
READY-MIX INDUSTRY EXPANDING	Mar	46	SKANSKA'S NEWEST LONG KILN PLANT SLAG PRODUCERS DISCUSS NEW USES Diversified program of National Slag Association convention considers freight rates, markets, percentage depletion, air environment and properties of slags for specific uses.	VALUE OF RELIMING NEEDS EMPHASIZING IN SELLING FARMER C. J. Chapman
REDUCTION OF SAND SIZES IN STOCKPILES Research indicates that time-lapse modulus of sands in stockpiles will vary because of loss in particle sizes with time. Theory is advanced that sand size loss may be a contributory factor to decrease of mortar strengths in course of time. Ernst W. Greiner	June	126	SMALL COMMUNITY BLOCK PLANT Noble & Howell, Farmington, Wis., enlarges production of concrete block, builds substantial demand for concrete burial vaults.	VERMICULITE INSTITUTE MEETING
REGIONAL MEETING OF A.C.I. LIME MEN National Lime Association also considered markets, new applications, pension plans, safety and industrial wastes at annual meeting.	July	90	SMALL PLANT MAKES PERLITE BLOCK SMALL PRODUCER REBUILDS TO IMPROVE AGGREGATE QUALITY Robert F. Welch	WASTE HEAT POWER WITH MAXIMUM KILN EFFICIENCY Auxiliary boiler in operation with new kiln-burner installation at The Monarch Cement Co. will meet peak requirements for fuel oil, so kiln can produce slinker at low fuel cost per ton. Burr Nordberg
ROCKY'S NOTES Puzzling, Puzzling, Puzzling, etc. Modern Political Economy in Practice More Than Rock Capital Required Imparting Data on Blast Furnace Slag Review of Long-Time Concrete Experience Accounting for Varieties of Igneous Rocks Sedimentation Processes Apply to Concrete Lithology: Experts' Journalism and Research Formulas for Concrete Preservation Highway Engineers as History Makers How Union Members Dilute Their Freedom Lime Used: Tools for Concrete Research	Jan	77	SOIL TESTING EXTREMELY IMPORTANT TO SALE OF LIMING MATERIALS Earl Jones	WATER DELIVERY OF AGGREGATES FOR READY-MIXED CONCRETE L. David Mink
	Feb	75	SOUTH AFRICAN PIPE OPERATION Centrifugal pipe production in variety of sizes. Specialty items include concrete launchers and telephone shelters. Douglas Long	WET PROCESS MANUFACTURED SAND FOR MT. MORRIS DAM Walter B. Lenthart
	Mar	72	STEPS IN KEEPING AN AGGREGATE PLANT UP TO DATE One of California's largest plants, operated by Consolidated Rock Products Co. at Riverside, is continuously upgraded, improved and modernized to guarantee capacity operation.	WET vs. DRY PROCESS Semi-dry process plants which effect modulation of kiln feed may prove practicable with improvements suggested. Dr. Shuen Goffe
	Apr	83		WISCONSIN CONCRETE MASONRY MEETING
	May	47		WORLD'S MOST UNIQUE ROTARY KILN INSTALLATION Caroling Giant Cement Co., Harpersville, S. C., operates two independent kilns to accomplish results of single long wet-process kiln in combining slaking, extraction, slaker to cement manufacture. Burr Nordberg
	June	37		
	July	113		
	Aug	93		
	Sept	78		
	Oct	73		
	Nov	69		
	Dec	65		



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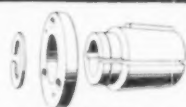
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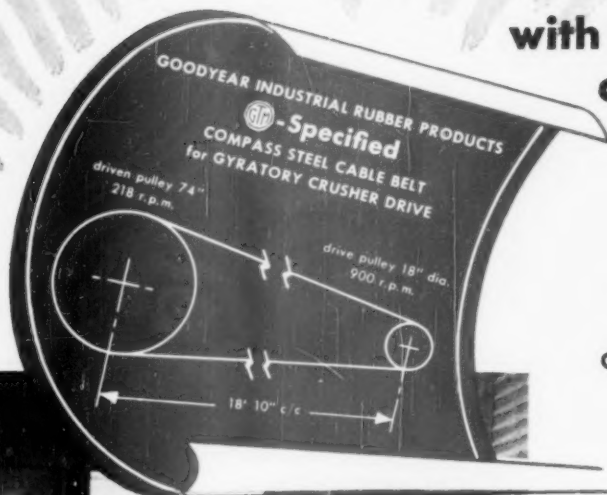


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